November 3, 2017
TO: Office of Strategic Initiatives
FROM: North Country Resource Conservation and Development Area Council
RE: Comments on potential updates to the NH 10 Year Energy Strategy

Thank you for the opportunity to provide comments on the update of the NH 10 Year Energy Strategy

The NH 10 Year State Energy Strategy is comprehensive and highly technical assessment of NH's current energy usage, and its future potential.

The Strategy should refine its over-arching goal(s) to succinctly capture the essence of the plan, through which progress can be measured. Goals should be a metric related to retention of energy expenditures in the state. To the extent that the plan does not provide this, it should be revised to achieve this.

The goal(s) should set out a clear set of actions framed around 1) the reduction in overall energy use (efficiency and conservation) and 2) the generation of the electric, thermal and transportation energy we use from sources we control and do not have to import (renewables and fuel switching). This is simple, and compelling. Use less energy, and of the energy we use – produce as much as possible here at home

This should be the primary focus of the plan. All tangible public benefits of a progressive energy strategy – job creation, resurgent and sustainable development, greenhouse gas emission reductions, environmental benefits, and mostly importantly economic self-determination – will flow directly from this goal. It can be easily measured, tracked and reported.

Policy makers and opinion leaders should be able to support this and it will be easier for NH citizens to understand, more compelling for people to support, and as a result, more likely to be accomplished.

Again, thank you for the opportunity to submit these comments.

I would like to see each town become more independent of the "big grids". Utilizing wind, solar, water, geothermal to provide as much energy as they can. It's not to be completely independent--- but be less dependent on the big grids.
Thank you

Leslie Jose

Hello,

The US Department of Energy website shows that NH is currently using building codes established in 2009. https://www.energycodes.gov/adoption/states/new-hampshire
Was there ever an update to these building codes?

Below I have provided a link to a 2013 letter from the U.S Department of Energy indicating that Governor Hassan dropped the ball on updating these codes as required. Was ever a response sent to the Department of Energy from our Governor's office? As you can see below, the letter from the Secretary of Energy speaks of HUGE savings in efficiency. I would love to see Governor Sununu champion those savings for our state.

https://www.energycodes.gov/sites/default/files/documents/NewHampshireDOEDeterminationLetter05312013.pdf

"Energy efficiency — getting more from the energy we use — is one of our top opportunities for helping households and businesses save money, growing jobs, and improving our environment. The Department is dedicated to helping states achieve greater energy efficiency, including the adoption and implementation of updated building energy codes. These codes are a cost-effective way to reduce energy bills and to employ energy efficiency measures that can be more costly to implement through subsequent retrofits. Energy cost savings for New Hampshire resulting from the state updating its building energy codes in accordance with federal law are significant, estimated to be on the order of nearly $40 million annually by 2030." - Dr. Kathleen Hogan

The most updated information I can find regarding the building codes, is a meeting agenda from the New Hampshire State Building Code Review Board from 8 September 2017, mentioning "Status of elimination of RSA 155-D, Energy Conservation in New Building Construction" - http://www.gencourt.state.nh.us/rsa/html/XII/155-D/155-D-mrg.htm

I would like to know much more about "status of elimination of RSA 155-D, Energy Conservation in New Building Construction." What level of public outreach has been pursued and to what extent has the public been invited to comment on such a monumental decision? The agenda I am referencing can be found at this link: https://www.nh.gov/safety/boardsandcommissions/bldgcode/meetings/documents/20170908-agenda.pdf

As part of my recommendations for the revisions to the 10-year stratey, I would like to suggest that we ***maintain*** efficiency and conservation in the language of our state building codes. As stated above in Dr. Hogan's letter, "These codes are a cost-effective way to reduce energy bills." Retrofits are more costly, and would be unnecessary if new buildings / homes are held to standard requirements before construction.

Thank you for your time and consideration,

Kaela Law
Francestown, NH

From Marianne Jackson, MD, MPH
Madison NH 03849

In light of the National Climate Assessment report, it is imperative that New Hampshire takes a strong position in its 10 year Strategy to uphold the Paris Climate Accords, strive to reduce greenhouse gas emissions on an even more aggressive timeline, and commit to supporting renewable energy and energy efficiency by all means possible.

This is an economic imperative. Our state's air quality, water quality, shoreline development, infrastructure stability (roads, bridges are obvious), agriculture and tourism are all susceptible to the damages of climate change. It is also a means of attracting the kinds of industry and young, talented workforce that is drawn to regions with investments in our energy future. We need to drastically reduce our reliance on outside sources of power and grow our in-state production of distributed renewable energy.

Specifically, in the coming 10 years, we need to

- Be consistent with all of New England in adopting and supporting electric vehicle transportation with widely distributed charging stations, procurement of EV's for municipalities and state agencies,

- Allocate a much higher percentage of RGGI funds to innovations and implementation of energy efficiency measures and growth of job training in renewable energy fields rather than fuel assistance. This investment should be broadened for municipalities and schools so that all rate payers can benefit.

- Require the PUC to triple the funding for renewable energy installment rebates for large and small installations.

- Set 50% higher targets in the RPS for renewable energy

- By 2020, determine alternative tax revenue sources other than gasoline (and not fuel-efficient cars) for road and infrastructure maintenance.

- Create financial incentives for non-profit organizations and municipalities to install large and small solar arrays with group net metering that can benefit low and moderate-income homeowners

- Stabilize rebate levels and incentive programs including net metering formulas to reduce uncertainty in the renewable energy industry.

I am a long time NH resident.

I think NH needs to get “green" as soon as possible. Global warming trends are occurring and we must take the most conservative green energy approaches to curb these trends as best we can.
We need to follow strategies that will pursue the greatest long term ratio of energy created to carbon emissions.

We should promote local green energy sourcing as much as possible.

Hydro Quebec’s energy and transmission (Northern Pass) originates too far away. That energy should serve Canadian needs. The impacts of their planned above ground transmission lines are too great. Northern Pass’s above ground transmission lines appears to be being pushed for, so that Eversource can make profits from it. That energy should go elsewhere, where it will not create such negative consequences as the power lines will, above ground, over the scenically valuable lands of Norther NH.

NH should pursue local green energy sources like local solar, local hydro, local wind. These local green energy solutions should be pursued in cooperation with the local communities, and should first serve to supply their energy needs, locally.

NH should also promote as much efficiency as possible. Allowable vehicle emissions standards should be cleaner. Appliance and Machinery efficiency should be promoted. Incentives for efficient buildings should be furthered.
Tax gasoline and automotive diesel higher.

Thank you,

Chris Rice
Berlin, NH

Please reference the attached ISO NE document regarding the growth and impacts of photovoltaic energy resources in New England, and in particular the graph on page 6.

As that curve illustrates, the hour at which peak demand on the grid's large scale electricity producers occurs is decreasing and shifting later into the day. With greater PV, peak loads appear to be in the time frame of 7 p.m. - 10 p.m., with a significant drop after 10 p.m. My observation is that even a modest quantity of battery-back up storage could contribute meaningfully to addressing the 7-10 p.m. peak time period, which could avoid the need for more expensive and less environmentally friendly energy resources to operate.

Accordingly, I believe an updated Energy Strategy should include elements that encourage the development and increased installation of battery storage technologies. I realize the economics and options for battery storage are not yet at a point sufficient to justify large scale movement in this direction. But initial steps in this direction will help to encourage better equipment development, as well as strategies for effectively integrating battery storage and energy release into the grid.

I personally have been living with PV power, completely off the grid, with battery storage for about 13 years. Our home is modern with few lifestyle compromises. A backup generator is required and averages about 16 hours/year of operation. So I think I can safely say batteries work. Providing for several days of cloudy weather for us requires a significant battery bank. But if the objective is only to gain a few hours of power, a much more modest installation would likely suffice and be feasible as well.

Regards,

Robert J. Cote
Deerfield, NH 03037

What We Do

Our Three Critical Roles

Our History

In Depth

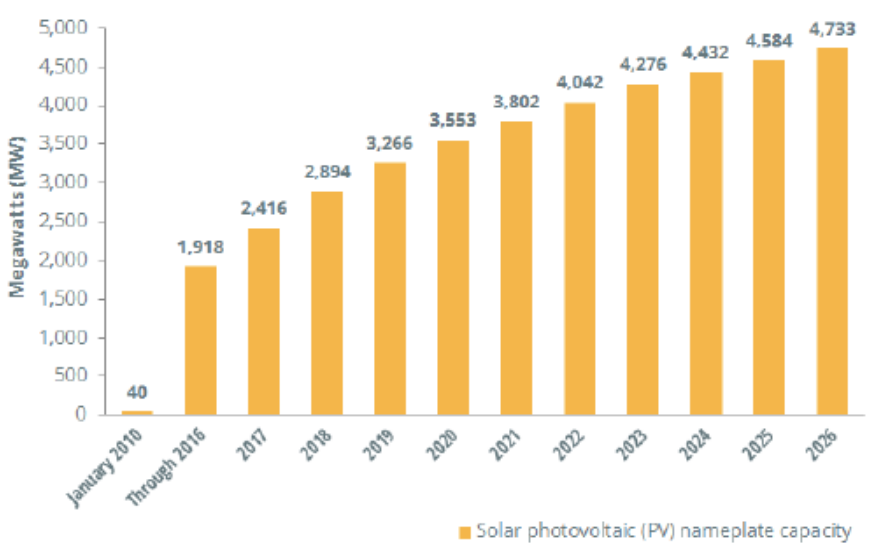
Solar Power in New England: Concentration and Impact

Solar power systems are rapidly being installed across the six states of New England and noticeably reducing the electricity drawn from the regional power system. But how much and when that electricity demand is reduced are critical questions when it comes to operating the grid and performing long-term system planning.

The region has about 2,000 MW of solar power. Of this, ISO system operators can only "see" about 50 MW in real time.

Solar Power Is Growing Quickly

State policies, state and federal support, tax credits, and falling technology costs are spurring remarkable growth in the installation of solar photovoltaic (PV) system in New England. The ISO's 2017 PV Forecast PDF anticipates almost 5,000 megawatts (MW) of nameplate PV capacity by 2026.



Note: Amounts include PV connected "behind the meter," as well as PV participating in the wholesale electricity marketplace.

Source: ISO New England, *Final 2017 PV Forecast* (May 2017)

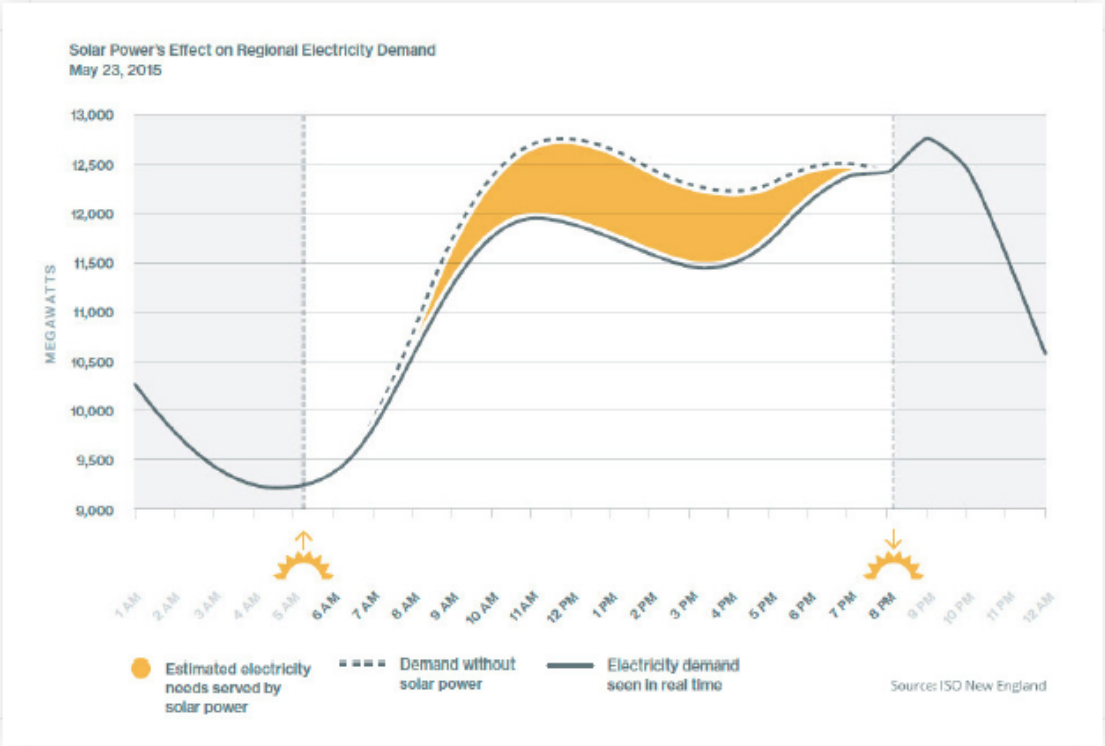
Regional Solar Power Reduces Demand from the Grid

The vast majority of New England's solar power is in the form of small-scale (typically 5 MW or less) systems, including residential rooftop arrays. These systems are typically connected behind the meter (BTM) directly to retail customers or to local utilities—and not to the regional power system. As a consequence:

BTM PV reduces the amount of electricity being drawn

from the grid. This is illustrated below by the region's load profile (the amount of electricity drawn from the grid by hour) for May 23, 2015: a clear, relatively cool day near the summer solstice—ideal conditions for PV production.

The output from BTM PV can't be monitored in real-time by ISO system operators. The challenge for the ISO, then, is to accurately predict the magnitude of the load-reduction caused by BTM PV in any given hour of any given day—and to quickly adjust to any load fluctuations in real time.



Output from Solar Power Systems Is Highly Weather-Dependent

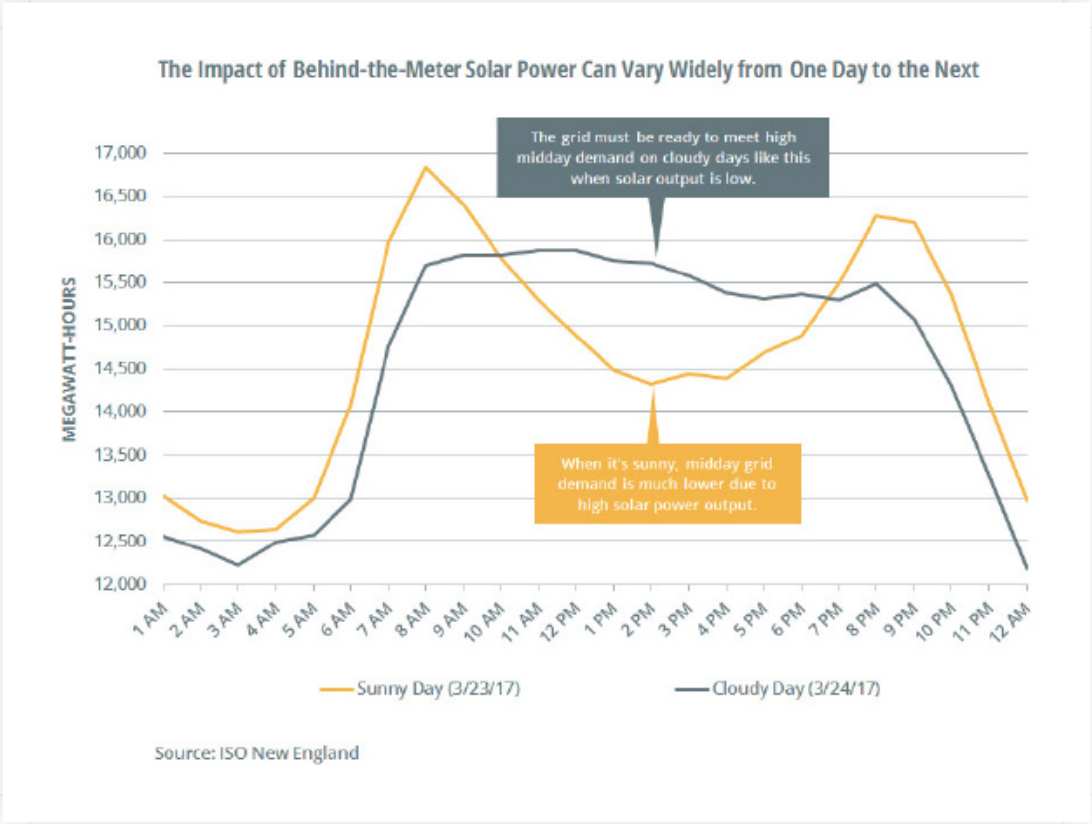
ISO system operators rely on accurate forecasts of grid demand because it's critical to keep the power supply in

near-perfect balance with demand at all times. But anticipating how much solar power there'll be at any moment is a complex problem. PV output depends on things like:

- How high—or low—the sun is in the sky
- The amount of cloud cover and haze
- Temperature and humidity
- Wind speeds
- Snowfall

These changing weather conditions can lead to rapid and sizeable swings in electricity output from PV systems, which is why PV resources are called variable or intermittent. It's also why as more variable resources are installed in New England, the region will rely more heavily on other power resources that can help balance the fluctuations of the combined load and behind-the-meter solar PV, such as efficient, fast-start natural gas power plants. New storage technologies may also one day help balance solar variability, as they become larger and more cost-effective.

The effects of cloud cover can be seen in the graph below of grid demand on March 24, a cloudy day, versus March 23, a sunny day.



Solar Power's Impact Varies by Season and Total Amount Installed

The amount of electricity New England uses varies greatly by season—so does PV's impact. The representative load profiles below simulate the impact PV will have during each season as more and more is installed across the region. Compare:

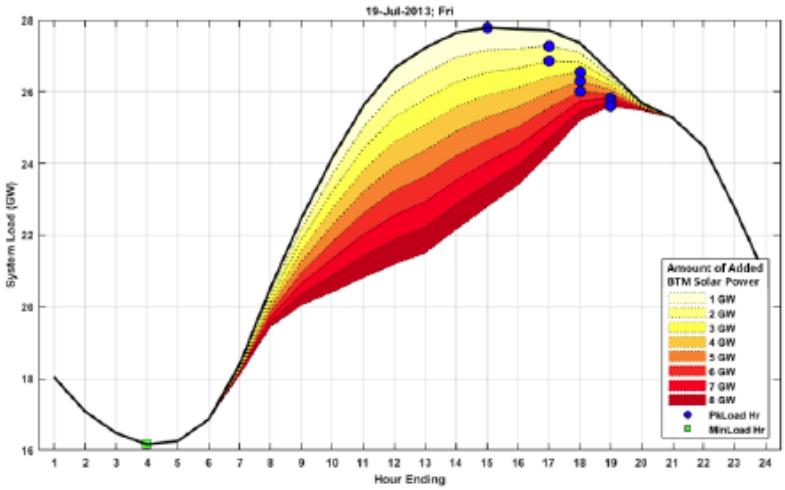
- Peak demand (the blue dots)—the day's highest level of grid electricity use
- How steep the climbs and drops become
- Minimum demand (the green squares)—the day's

lowest level of grid electricity use

Summer | Winter | Spring/Autumn « Prev / Next »

Summer Load Profile with Increasing Behind-the-Meter Solar Power

Summer comprises the highest electricity use in New England, largely because of air conditioning. PV clearly helps "shave the peak" when the peak falls during daylight hours. Because greater amounts of PV will shift the timing of peak demand for grid electricity to later in the afternoon or evening, PV's ability to reduce peak demand will diminish over time.



Source: ISO New England

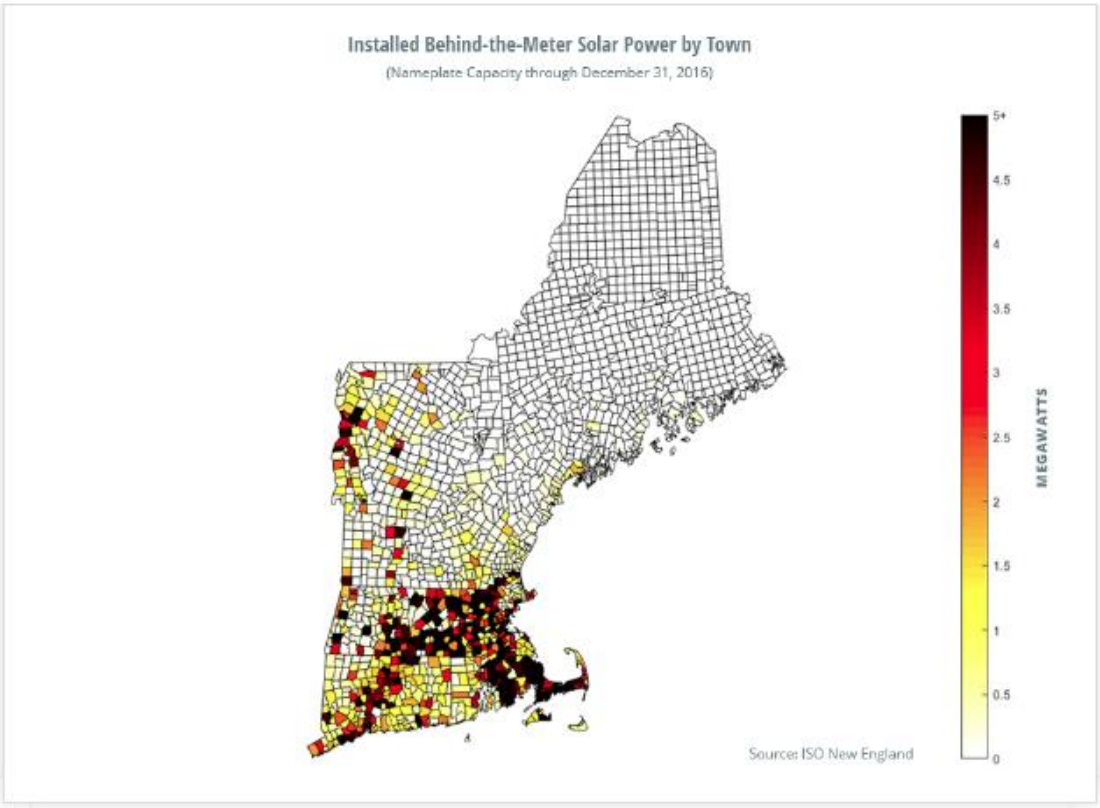
The ISO Is Developing a Better Picture of the Region's Installed Solar Power

The ISO is studying other possible implications of PV displacing conventional power resources. Conventional resources have physical characteristics that are critical to helping regulate transmission line power flows, frequency, and voltage, which help maintain power grid reliability. Learn more in *The Basics of Essential Reliability Services,* a series of videos presented by the North American Electric Reliability Corporation (NERC).

The ISO is also actively pursuing new and innovative ways to accommodate the effects of large amounts of solar power. We developed the nation's first long-term,

multistate forecast of PV capacity. We've also prototyped a day-ahead forecast of regional behind-the-meter PV output based on forecasts of irradiance (the sun's strength), which helps estimate how much electricity demand will be reduced by PV, and are working to upgrade this prototype into a production-grade forecasting system (similar to the ISO's wind power forecast).

As part of this project, we're collaborating with distribution utilities to understand and track the amount and location of PV capacity across New England. The heat maps below show the aggregated installed nameplate PV capacity by town within each state through December 31, 2016. Please note that the color scale varies by state in order to more effectively illustrate the distribution of PV capacity within each state.



APPLICATIONS
GADS Reporting
IRTT
ISO Express

MARKETS AND OPERATIONS FORECASTING
Morning Report
Seven-Day Forecast
Three-Day Forecast
Power System Status

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Nov 5, 2017

Office of Strategic Initiatives

Dear Strategic Initiatives,

New Hampshire needs a clean energy future. As you consider revisions to the State Energy Strategy, I urge you to prioritize clean energy, energy efficiency, and achievable climate goals. This will help not only the NH economy but the health and well-being of NH residents.
Clean energy will help keep our natural tourist attractions welcoming and attractive sites to help our tourist economy thrive.

We need a state energy strategy that is built on modern energy resources like solar and wind, not on dirty fossil fuels. That aggressively uses energy efficiency to lower energy costs for families and businesses alike. That prioritizes electric vehicles so New Hampshire doesn't fall behind on the transportation revolution or lose tourism dollars. And that puts New Hampshire on a trajectory to address climate change now when it matters most, not later.

It's time for New Hampshire to lead on clean energy. Clean energy and energy efficiency bring good local jobs and reduce rates of asthma and illness among New Hampshire children. With forward-thinking investments, New Hampshire can become a climate and technology leader, keeping more money in our local economy and spending less on out-of-state oil and gas. And these investments will provide our children with the jobs of the future, not jobs sure to be phased out.

Our State Energy Strategy currently calls for strong energy efficiency programs, more clean energy, and electric vehicles. Any revised strategy should continue to call for these, and must also include rigorous but achievable greenhouse gas emissions reduction goals in line with the 80% less by 2050 objective in the New Hampshire Climate Action Plan.

I urge you to support the clean energy future we need. Thank you.

Sincerely,

Ms. Linda Kipnes
Hudson, NH 03051-5075

Thank you for the opportunity to contribute to the discussion of New Hamphsire's energy strategy.

Maine and Massachusetts have taken steps to develop offshore wind energy. The federal bureau of offshore energy management coordinates efforts and could help New Hampshire work in a regional manner to take advantage of the offshore wind resource. The Governor's office should work with BOEM to that end. Another related idea, in the event that the federal government initiates another round of military base closures, is to convert the Portsmouth Naval Shipyard into a staging facility for offshore wind construction. We have a small coastline, but we can still participate and benefit from offshore wind development.

In general, speaking as an "early adopter" who has been living off the grid with solar electric energy since 1986, and driving a hybrid since 2002, I will say that any work we can do to encourage conservation and a future free of fossil fuels is well worth the effort. I know that weather does not equal climate, but we can see the effects of a warming world.

Thank you.

Fred Portnoy
Canterbury, NH

NH should proceed in its energy policy, planning, and implementation according to the parameters laid out in the following links:

http://web.stanford.edu/group/efmh/jacobson/Articles/I/WWS-50-USState-plans.html

Interactive infographics:
http://thesolutionsproject.org/why-clean-energy/

Good morning-
Throughout my career I was a senior education administrator in several Rocky Mountain states. I moved back to NH and am very supportive of renewable energy as a way to decrease pollution and increase economic competitiveness (I taught economics). I am not a fan of wasteful governmental spending but understand that fighting broad based problems (pollution, co2) and supporting regional economic growth (forward focused innovation in renewable energy) are great places to invest government resources. This is using public money for the public good.
Thanks for listening, Todd

Todd Horn, Ed.D.
Board Consultant |Executive Coach

Dear Office of Strategic Initiatives,

Please find comments in the PDF enclosed for public input to the 10 year State Energy Strategy.

Thanks,
-chris

Dear Office of Strategic Initiatives,

Thank you for offering the public an opportunity to send Comments regarding the New 10 Year State Energy Strategy.

Goals that should be or must be required for the Strategy:

- Grid-scale battery storage:
  - Grid-tie peak shaving; help the grid operators reduce their stress level
  - Grid-tie peak-time shifting, power generation rate optimization (cost leveling); charge when less expensive, discharge when needed
  - Investment alleviation or deferral (defer sudden costly upgrades, allows better long range amortization and planning over time for rate payers)
  - Faster response than fuel burning or steam-based power plants[1]
  - Renewable energy peak-time shifting to optimize further, any grid constraints
  - Renewable energy smoothing and management; unsettled weather mitigation
  - Reactive power factor correction (propping up the grid); stability

- Distributed battery storage at distributed generation sites, residential or industrial:
  - Industrial electric customer Electricity Rate Optimization (lowers their electricity bills); why doesn't every industrial site do this to abate peak-metering cost spikes?
  - Residential distributed generation and battery storage remediating "wait 'til 8" busy household appliance operations
  - Remediates grid issues when renewables "disappear"; when a cloud goes overhead or if the wind stops blowing…
  - Abatement of locally fuel-powered portable power plants in parking lots
  - Distributed reactive power factor correction capabilities ("propping up the grid"), also increasing grid stability locally[2] near or at the demand load side

By way of example[3]: https://www.youtube.com/watch?v=1xks0sIJnBY

[1] For example, Granite Ridge in Londonderry, NH is specified to only be able to ramp up power at 5MW per minute.

[2] Traditionally, utilities will place switched banks of capacitors near heavy industrial reactive (usually inductive) loads to counteract the effects of the reactive power factor and provide grid stability. Capacitors are similar to batteries in concept (with power factor correction capable inverters), but without the additional benefit of longer storage capabilities of batteries.

[3] I am not affiliated with Schneider Electric. There may be other competitors too.

Why a New York utility could save $1billion for only $200million

"…Consolidated Edison, one of the largest investor owned utilities in the US, is seeking to stave off the need to invest US$1 billion in infrastructure spending on a substation, using a request for demand side measures that are likely to include [battery] storage…"

- https://www.energy-storage.news/blogs/why-a-new-york-utility-could-save-a-billion-for-us200-million
- https://www.greentechmedia.com/articles/read/con-eds-200m-distributed-energy-plan-gets-the-green-light

Additional Understandings:

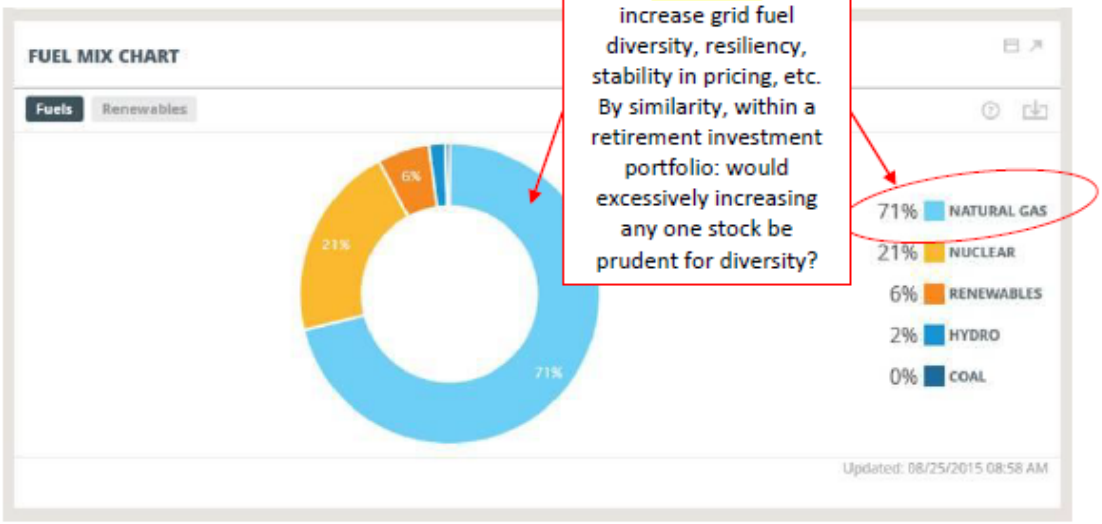

Figure 1: Fuel Mix Chart for New England power generation (from ISO-NE.com) 08/25/2015

For New Hampshire to be competitive and attract businesses with peak-metered electric bills (transmission rates and energy consumption rates) coupled with already baked-in disadvantageous stranded costs (e.g., the approximate $0.5 Billion cost of an abandoned scrubber), we must include incentives for renewables with peak shaving and peak shifting equipment using battery energy storage.

In order for utilities in New Hampshire to remain viable in this age of decreasing renewable costs and customer sensitivity for reducing their electric bill costs, New Hampshire's energy future must include grid-scale battery storage, renewables, incentives and metering methods, for other scales of battery storage and distributed generation on the demand side.

To whom it may concern,

I and my wife are deeply opposed to Northern Pass as long as it is on towers above ground. If they bury it, we have no problem. New Hampshire scenery is not for sale. The majority of the power is headed for states south of us so why should be despoil our state for them. Bury the damn thing and let Eversource and the southern rate payers absorb the extra cost.

Van and Betsy Adriance
Center Sandwich, NH 03227

Dear Sir or Madam:

Attached please find a petition titled “Calling for a Great State Energy Strategy for New Hampshire” that is being submitted to the Office of Strategic Initiatives as the testimony/comments of 315 New Hampshire residents (including me) and businesses relative to this matter—in addition to such testimony/comments as the signatories to the attached submit on their own.

As is indicated on the attached, this petition is sponsored by the Citizens' Climate Lobby (New Hampshire chapters), ECHO Action, 350NH and Toxics Action Center. Special thanks are extended to Anne Huberman, being copied on this e-mail, for all of her fine work in preparing and managing this online petition.

As the attached is rather large, I would greatly appreciate acknowledgment of receipt of this e-mail and the petition by whoever opens this e-mail. I have also requested a “Delivery Status Notification” and “Return Receipt” on my end, but am not sure if these requests will translate to your end.

Thank you for your time and courtesy, and for accepting testimony/comments in this matter.

Sincerely,

Richard Husband

Litchfield, NH 03052

Calling for a Great State Energy Strategy for New Hampshire

This petition is sponsored by Citizens' Climate Lobby, ECHO Action, 350NH, and Toxics Action Center.

We, the signatories to this petition, urge that the New Hampshire 10-Year State Energy Strategy pursue a clean, healthy, economical energy future least impacted by climate change through:

• The robust promotion of energy efficiency programs, policies and measures to reduce health-impairing pollution and lower energy costs

• Emphasizing the development of renewable energy resources, especially solar and wind, that do not accelerate climate change by greenhouse gas (carbon) emissions, but will create jobs and establish a strong New Hampshire foothold in the emerging green energy economy

• The immediate curtailment of state reliance on fossil fuels (oil, coal and natural gas) that cause pollution, accelerate climate change and expose utility ratepayers to inflated rates by overdependence on such fuels

• Adherence to the Carbon Coalition's Climate Change Resolution passed by more than 2/3 of New Hampshire towns in 2007, which calls upon the federal government to address climate change and develop research initiatives to create responsive innovative energy technologies

• Continued state membership in the Under2Coalition, which commits to reducing greenhouse gas emissions to near net-zero by 2050

• Adding New Hampshire to the U.S. Climate Alliance, which commits states to meeting the U.S. goals of the Paris Agreement on climate change

• Committing to 100% renewable energy use by 2050

• Presenting young job-seekers and businesses with a vision for the future that is fresh, welcoming of innovation, cutting-edge technologies and public transportation systems, building economically strong, healthy, safe communities, while protecting New Hampshire's natural resources and scenic beauty

In furtherance of the above, we specifically call for:

• New Hampshire to request an offshore wind task force from the Bureau of Ocean Energy Management to bring offshore wind to New Hampshire

• Prioritization of electric vehicle use and measures to facilitate the same such that the state encourages citizens to join in this critical, emerging transportation revolution and does not lose tourism dollars to states providing for easier electric vehicle use

• A declaration that the Public Utilities Commission should consider further natural gas use and infrastructure expansion to be against the public interest and contrary to the official New Hampshire Energy Policy codified under RSA 378:37, as such use and expansion runs counter to the statutory directive to diversify our energy resources, presents health and safety risks and damages our environment

• New Hampshire to support carbon pricing at the state, regional and/or national level as carbon pricing will reduce pollution and greenhouse gas emissions, prevent health problems and premature deaths and, if collected fees are distributed to consumers, substantially stimulate our economy

Signatures on the Petition Calling for a Great State Energy Strategy for New Hampshire

	Date	Full Name	Street Address	Town and Zip Code	State	Email address	Comments (optional)	
1	10/15/2017	Anne Huberman	50 Timberpond Drive	Peterborough, 03458	NH	Anne.Huberman@gmail.com	OSI should plan for the state as if there will be a fee on carbon. It's more and more likely to pass in Congress.	
2	10/16/2017	Joel Huberman	50 Timberpond Drive #1104	Peterborough, 03458-178(	NH	joel.huberman@gmail.com	Let's make New Hampshire great again!!	
3	10/16/2017	John Gage	12 Fordway Extension	Windham, 03087	NH	jhgage@gmail.com	Please also use proxy carbon pricing (at least $50/ton CO2e for fossil fuels) in all state policy analysis to more accurately reflect the costs of the use of fossil fuels to our state. This will also help include the risk of a future national carbon price on our current state policy choices.	
4	10/16/2017	Shaina Kasper	141 Main Street, Suite 6	Montpelier, 05602	VT	shaina@toxicsaction.org	Although I live in Vermont, I do a lot of work in New Hampshire with Toxics Action Center, working side-by-side community groups facing pollution threats in their neighborhoods. We know that New Hampshire has to move away from dirty fossil fuels and towards clean, local, renewable energy -- and soon!	
5	10/16/2017	Stephanie A. Scherr	27 NH Route 119 East	Fitzwilliam, 03447	NH	EarthDancerSteph@gmail.com		
6	10/16/2017	ECHO Action NH	27 NH Route 119 East	Fitzwilliam, 03447	NH	ECHOactionteam@gmail.com		
7	10/16/2017	Griffin Sinclair-Wingate	160 Packers Falls Road	Durham 03824	NH	griffinsw94@gmail.com		
8	10/16/2017	Patricia A Martin	17 Farrar Road	Rindge 03461	NH	pmartin2894@yahoo.com	#RF100	
9	10/16/2017	Mary E Raven	9 Four Winds Rd	Merrimack, 03054	NH	marybeth.raven@gmail.com	A strategy that supports clean energy also supports public health. Other states such as California have both embraced clean energy and grown their economy.	
10	10/16/2017	Rita Sebastian	73 Cindy's Lane	Campton, NH. 03223	NH	Sebastian.rita@ gmai.com		
11	10/16/2017	David J. Moloney	56 Pierce Lane	Hollis 03049	NH	moloney@progress.com	Inherent in the above-proposed strategy is much needed energy decentralization for combating the worst effects of climate change and for creating the resiliency New Hampshire will need to sustain a robust energy future.	
12	10/16/2017	Gerald S. Petersen	2 Modean Dr.	Derry, NH 03038	NH	gerry.petersen@comcast.net		
13	10/16/2017	Denise Reitsma	266 Prospect Hill Road	Canaan 03741	NH	dvreitsma@gmail.com	It is imperative that NH be forward thinking on energy and climate. There will be no regrets in taking these steps, but the opposite will be true if we maintain the status quo and fall behind, especially among the other New England states.	
14	10/16/2017	Laura & Ken Lynch	185 Moran Rd	Temple 03084	NH	lynch.lauranh@gmail.com		

Signatures on the Petition Calling for a Great State Energy Strategy for New Hampshire

	Date	Full Name	Street Address	Town and Zip Code	State	Email address	Comments (optional)	
15	10/16/2017	Barbara Evans	347 Route63	Chesterfield	NH	bphilby@gmail.com	We are ino talking solar panels on our home, as we feel the accumulation of carbon in the air that we breathe and the addition of mercury in our food from greenhouse gases is detrimental to our health of us and the next generation of humans and animals on this planet.	
16	10/16/2017	Aimee Ruiter	86 Guinea Ridge Road	Gilmanton, NH 03237	NH	Aimee.Fitzpatrick@gmail.com		
17	10/16/2017	Marjorie Shepardson	94 Pleasant St.	Marlborough 03455	NH	marge.shepardson@gmail.com		
18	10/16/2017	Marcia Kayser	215 Baker Street	Keene 03431	NH	mrckys@gmail.com		
19	10/16/2017	Matthew Zinicola	55 Green Farm Rd	New Ipswich 03071	NH	mattzinicola@gmail.com		
20	10/16/2017	Justin Jennings Landowne	12 School St.	Exeter 03833	NH	jjl218@lehigh.edu		
21	10/16/2017	Carol Powley	18 Summer Street Apt C	Swanzey 03446	NH	clpow2601@gmail.com	We want clean, fossil fuel free energy in New Hampshire. We have spoken against pipelines before- so please hear us again - we DON'T want them in our state!!!	
22	10/16/2017	Jacob H Lewis	45 Glenbrook Rd.	Marlborough, NH 03455	NH	jacobtravels87@gmail.com		
23	10/16/2017	Lynda	21 Ducas Avenue	Nashua 03063	NH	lyndadobens@ icloud.com		
24	10/16/2017	Paul Cully	5 Ezras Way	Dover - 03820	NH	pac4patriot@comcast.net		
25	10/16/2017	Philip Browne	103 Staniels Road	Loudon 03307	NH	pbrow1199@gmail.com	Use of K-20 education to facilitate an understanding of the materials and processes used by scientists to understand the relationship of humans to their environment. Thanks	
26	10/16/2017	Grace Burson	18B Hartford Lane	Nashua, 03063	NH	gracepburson@gmail.com		
27	10/16/2017	Clarice Perryman	17 Belknap St	Dover 03820	NH	cperryman16@gmail.com		
28	10/16/2017	Colleen O'Brien	238 Base Hill Road Unit 41	Keene NH 03431	NH	cobrienvt@yahoo.com		
29	10/16/2017	Gerald Beck	113 Sargent Rd	Holderness, NH 03245	NH	j_jbeck@roadrunner.com	I believe that Thorium-based nuclear power should be researched further.	
30	10/16/2017	Michael A McGuire PE	1042 Hurricane Hill rd	Mason 03048	NH	mike@h2dc.com	Information on NH air quality is available at New Hampshire dept. of environmental services.	
31	10/16/2017	Alison Kachanian	6 Hidden valley rd	Windham 03087	NH	Jyay@me.com		
32	10/16/2017	michael katz	251 colburn rd.	temple 03084	NH	michaelkatzcats@yahoo.com		
33	10/16/2017	Aaron Katz	50D Steele Road	Peterborough, NH 03458	NH	buddhaboymail@gmail.com		
34	10/16/2017	Marilyn Learner	62 Baxter Rd.	Hollis 03049	NH	Mzlearner@gmail.com	Please step up, NH! Look to the future rather than maintaining the corporate interests of the fossil fuel past! The 20th century is over....	
35	10/16/2017	miriam kurland	592 doetown rd.	rumney 03266	NH	mimbck@yahoo.com		
36	10/16/2017	Marie McCormick	25 Prospect St	Lebanon, NH 03766	NH	marie.m.mccormick@gmail.com		

Signatures on the Petition Calling for a Great State Energy Strategy for New Hampshire

	Date	Full Name	Street Address	Town and Zip Code	State	Email address	Comments (optional)	
37	10/16/2017	Nicholas R Dundorf	217 McDaniel Shore Drive	Barrington 03825	NH	ndundorf@gmail.com		
38	10/16/2017	Julia Steed Mawson	17 South Shore Dr.	Pelham 03076	NH	islandview999@aol.com	Thank you for taking this comment. I realize that there are no easy answes, but a full analysis and vision for a future with renewable energy approaches is essential.	
39	10/16/2017	Henri Vaillancourt	91 Mill St.	Greenville 03048	NH	718nma@surfglobal.net		
40	10/16/2017	David B. Simpkin	101 Old Bridge St.	Pelham 03076	NH	simmmms@msn.com		
41	10/16/2017	Richard S. Carvalho	150 Rivermead Rd. Apt. 23	Peterborough N.H. 03458	NH	carvalhodick@gmail.com	important !	
42	10/16/2017	Jeanne Sable	160 Dunton Rd.	Fitzwilliam 03447	NH	jeannesable@gmail.com	This is vital to NH. Our future depends on it.	
43	10/16/2017	Mariah Oneill	2A Vilage Ln	Peterborough NH 03458	NH	mariahon@comcast.net	Clean energy please.Stop pandering to the oil money.	
44	10/16/2017	Douglas Whitbeck	756 Brookline Road	Mason, 03048	NH	dwhitbeck@hotmail.com	The State Energy Strategy signed by then-Governor Hassan wisely recommended "a diverse energy portfolio." We are already overly dependent on fracked gas for electrical generation. And although scientists are reluctant to specifically blame human-exacerbated climate change for the severity of this year's hurricanes and forest fires, those events are exactly what climate change scientists have predicted. Climate change does make weather events more extreme. Invest in our future, not our demise. Encourage a distributed, smart electrical grid. Encourage energy conservation measures that reduce the need for additional generating facilities and transmission lines. Encourage the use of renewable energy resources.	
45	10/16/2017	William D. Dallas	18 Hansom Drive	Merrimack 03054	NH	William.Dallas@comcast.net		
46	10/16/2017	Nicholas Warren	84 Mascoma St #1	Lebanon, NH 03766	NH	warren.nicholas.jh@gmail.com	We are already witnessing the effects of climate change : increased flood damage, wild fires, and the spread of lyme's disease. Urgent action is needed now to curtail our use of fossil fuels.	
47	10/16/2017	Kathy Cobb	28 Marshall Court	Keene 03431	NH	kcobb@myfairpoint.net		
48	10/16/2017	Marilyn Wilking	52 Stevens Lane	Walpole 03608	NH	Mwilking@att.net		
49	10/16/2017	Sylvia Russell	8 Croghan Lane	Durham 03824	NH	swr@cs.unh.edu		
50	10/16/2017	Mark A. Godin	5 Wellesley Drive	Pelham 03076	NH	mgodinr75@aol.com		

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51	10/16/2017	Mary Woodward	131 Wednesday Hill Road	Lee NH 03861	NH	mhwoodward@comcast.net	Commensurate with its first-in-the-nation-primary status, New Hampshire should also be a leader when it comes to environmentally friendly energy policies and actions that position the state as an effective competitor in the economy of the future.	
52	10/16/2017	Kat McGhee	237 Hayden Road	Hollis. 03049	NH	Kmcghee257@gmail.com		
53	10/16/2017	James Taylor Fearnside	One Sand Hill Road #22	Peterborough, 03458	NH	jim.fearnside@gmail.com		
54	10/16/2017	David N. Pyles	82 Lead Mine Road	Nelson NH 03457	NH	dnpyles@acousticmusic.com		
55	10/16/2017	Fr Samuel Fuller, OFM Cap	383 Beech St	Manchester 03103	NH	sfullerofmcap@gmail.com	It is vital that we come together as a state and as a community to work towards a sustainable future.	
56	10/16/2017	Dick Devens	78 Maple St	Center Sandwich 03227	NH	rdevens41@gmail.com	This is very important.	
57	10/16/2017	Donald Leisman	523 N. Pembroke Rd	Pembroke 03275	NH	dleisman1@yahoo.com	I agree with this 100% for many reasons, especially the creation of good paying jobs with good benefits.	
58	10/16/2017	Bruce Tucker	15B Village Lane	Peterborough NH 03458	NH	bruce@2cker.com	Ecourage EV friendly rate structures for off-peak residential charging and eliminate demand charges for EV charging on commercial rates	
59	10/16/2017	Douglas McLane	6 Rogers St	Plymouth 03264	NH	Mclanedouglas@hotmail. Com		
60	10/16/2017	Sylvie Stewart	44 Spring Cove Road	Nashua 03062	NH	shs_allareone@comcast.net		
61	10/16/2017	Margaret Viglione	14 Hubbard Hill Rd	Greenville 03048	NH	pegviglione@comcast.net		
62	10/16/2017	Robert Gordon	12 Legacy Lane	Peterborough 03458	NH	Robgord52@aol.com		
63	10/16/2017	Margery Prazar	39 Stratham Grn	Stratham 03885	NH	mprazar@comcast.net		
64	10/16/2017	Neal W. Ferris	24 Woodridge Road	Durham, 03824	NH	naturalreligion@gmail.com	NH need more wind and solar energy that will also create more jobs.	
65	10/16/2017	Robert Meagher	30 Knotwood Drive	Greenfield 03047	NH	meagher@alum.mit.edu		
66	10/16/2017	Susan Opal	221 morgan Rd	Richmond 03470	NH	susanopalwyatt@gmail.com	NH is bussiness friendly make it innovation when it comes to energy too.	
67	10/16/2017	Peter E. Martin	280 Old Hebron Rd.	Plymouth 03264	NH	martinp003@gmail.com		
68	10/16/2017	Frank J Mollica	135 Number 4 Road	Fitzwilliam 03447	NH	Frankiethefixer@yahoo.com		
69	10/16/2017	gerry coffey	956 mason rd	wilton 03086	NH	gerrycoffey123@gmail.com	NH needs to be on board with the energy jobs of the future along with the clean energy being the energy of the future.	
70	10/16/2017	Diane Varney-Parker	1241 Brookline Rd.	Mason 03048	NH	parkervarney@yahoo.com		
71	10/16/2017	John E. Carroll	54 Canney Road	Durham, N.H. 03824	NH	carroll@unh.edu	We need the diversity for security.	
72	10/16/2017	John C Balch	531 Lyndeborough CTR RD	Wilton 03086	NH	chris1953balch@gmail.com	Make NH a green energy leader!	

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73	10/16/2017	Lucy Daniels	32 Homestead Ln.	Nelson NH 03457	NH	ldaniels1@myfairpoint.net		
74	10/16/2017	Terry Burlingame	289 Stone Road	Gilmanton 03837	NH	tburlingame@hotmail.com		
75	10/16/2017	Janet E Fotos	26 Truell Road	Hollis 03049	NH	Janfotos@charter.net		
76	10/16/2017	Nancy Eddy	110 Farr Rd	West Chesterfield 03467	NH	hawkfrom _handsaw@yahoo.com		
77	10/16/2017	Katharine (Kate) Coon	10 Elm Street	Peterborough 03458	NH	kate2coon@gmail.com kate_coon@nobles.edu	New Hampshire has the resources and the vision to be a LEADER in smart, socially just, economically effective and sustainable energy. Let's do this for our state, our economy and our children and grandchildren.	
78	10/16/2017	DAVID E ROBINSON	99 CARROLL STREET	KEENE, NH 03431	NH	davide.1945@hotmail.com	I support our doing all we can to ameliorate climate change, especially eliminating the use of fossil fuels and substituting the use of renewable energy sources such as solar and wind power. We also as a state should support making our buildings as energy efficient as possible.	
79	10/16/2017	Terri O'Rorke	34 Hillside Ave.	Keene 03431	NH	terrio21@yahoo.com	New Hampshire needs to lead not fall backwards! Clean and renewable energy is the way to go. The planet has been speaking, are we not listening??	
80	10/16/2017	Richard Husband	10 Mallard Court	Litchfield, NH 03052	NH	RMHusband@gmail.com	Please harness the power, promise and prosperity of green energy!	
81	10/16/2017	Barbara Capron	58 Hampton Mdws	Hampton, NH 03842	NH	bcapron17@gmail.com		
82	10/16/2017	Pauls and Stephen Gnibus	1 Page Hill Rd.	New Ipswich 03071	NH	paula_steve@comcast.net		
83	10/16/2017	melinda meyerhoff	166 main st	meriden 03781	nh	melinda229@gmail.com		
84	10/16/2017	Suzanne Allison	873 N Barnstead Rd	Center Barnstead 03225	NH	suz.allison@gmail.com		
85	10/16/2017	Virginia (Ginger) Riege-Blackman	Blackman Road	Chichester, 03258-6101	NH	ginger.blackman@gmail.com	Please help keep New Hampshire beautiful and help insure a healthy and economically sound future for us all.	
86	10/16/2017	Donna S. Robbins	11 Hancock Street	Keene, 03431	NH	ms.deerobbins@gmail.com	Highly recommend the actions in this petition	
87	10/16/2017	Daniel Goodenough	233 French Pond Road	Henniker 03242	NH	daniel.goodenough@comcast.net		
88	10/16/2017	Eric Martin	2A Misty Morning Drive	Derry 03038	NH	ericm@gsinet.net		
89	10/16/2017	Michelle Dunn	138 Cunningham Pond Rd	Peterborough, 03458	NH	damomma94@hotmail.com		
90	10/16/2017	Marilynn Acker Ezell	47 Mountain View Rd	Temple 03084	NH	DrAcker@quackers.net		
91	10/16/2017	Janet Altobello	33 East Hill Rd.	Peterborough 03458	NH	jaltobello@myfairpoint.net	Let's be leaders!	

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	Date	Full Name	Street Address	Town and Zip Code	State	Email address	Comments (optional)	
92	10/16/2017	Kathryn Conover	33 Shadowland Road	Alstead 03602	NH	kaycey96@comcast.net	We are working hard, town by town, to achieve 100% clean, renewable energy by reasonable target dates. We do not want pipelines, decompression skids, or fracked gas in NH. Clean, renewable, nontoxic energy should be the NH goal.	
93	10/16/2017	Rachel W. Courtney	149 Goldmine Rd.	Dublin 03444	NH	rachelcourtney55@gmail.com	Dear OSI: We are closing in on the 11th hour for turning the tide on our rapidly warming climate. The State of NH needs to (ASAP) support the US Congress voting into law a FEDERAL REVENUE-NEUTRAL CARBON FEE*, to formally document that support, and present that documentation to NH's congressional delegation, so they know they have our support in advocating and voting on NH's behalf. This will help our economy and climate in NH, as well as our country, and the world's nations beyond our borders. *As developed by Citizens' Climate Lobby (www.citzensclimatelobby.org). THANKS, Rachel Courtney of Dublin, NH	
94	10/16/2017	Kasia Beznoska	112 Main Street #4	New Hampton 03256	NH	Kasia.peace@gmail.com		
95	10/16/2017	Eleanor Rouillard	10 Fordway Extension	Windham 03087	NH	foresthavn@aol.com		
96	10/16/2017	Stephanie Corbin	3 Bela View Dr	Bow 03304	NH	bockman04@gmail.com		
97	10/16/2017	Jennings Boley	80 Wiswall Rd	Durham 03824	NH	jenningsboley@icloud.com		
98	10/16/2017	Patricia mroz	6 Watersedge Dr	Nashua 03063	NH	Smroz@comcast.net		
99	10/16/2017	Debbie Farr	646 N. Stark Hwy	Weare, 03281	NH	debbiesfarr@gmail.com		
100	10/16/2017	Claudia Leidinger	354 Hackleboro Road	Canterbury, 03224	NH	leidinger@comcast.net		
101	10/16/2017	Wes Tator	411 Middle St, #5	Portsmouth 03801	NH	westator@gmail.com		
102	10/16/2017	Jana Elizabeth Howe	25 Spring Hill Road	Mont Vernon, 03057	NH	janahowedy@comcast.net	I am so pleased that states have the ability to adhere to Paris climate accords even if our president pulls out of them. Many thanks in advance.	
103	10/16/2017	Kieron D. Walsh	149 Goldmine Road	Dublin 03444	NH	Kierondwalsh@gmail.com	Do something positive that has bipartisan support today!	
104	10/16/2017	Michael Fleming	8 Woody Lane	Lee 03861	NH	mfzenith@gmail.com	Whatever we do, we should not back off of the current plan's goals for reduction of New Hampshire's carbon footprint.	
105	10/16/2017	Ruth M Heath	49 Wyven Rd	Canterbury 03224	NH	ruthmheath@comcast.net		
106	10/16/2017	David Blair	77 South Road	Harrisville, NH 03450	NH	orionblair@gmail.com		
107	10/16/2017	Nate Bernitz	16 Jane St	Manchester, 03104	NH	natelex7791@gmail.com		
108	10/16/2017	Laura Lynch	185 Moran Rd	Temple 03074	Nh	Lynch.lauranh@gmail.com		

Signatures on the Petition Calling for a Great State Energy Strategy for New Hampshire

	Date	Full Name	Street Address	Town and Zip Code	State	Email address	Comments (optional)	
109	10/16/2017	Beth Burns	Spruce Street	Merrimack 03054	NH	lovetheocean4@msn.com	There are logical, realistic methods of saving energy. Paying for the Northern Pass and other places looking for money from us, is not the answer. There are energy saving tactics that will benefit the people of the state of New Hampshire. The residents come first.	
110	10/16/2017	Gail DuFresne	714 Old New Ipswich Rd	Rindge, 03462	NH	gpainterspet@aol.com		
111	10/16/2017	Barbara Jo Kingsley	93 B Steele Road	Peterborough 03458	NH	barbjokingsley@gmail.com	I whole heartedly support this very well thought out petition.	
112	10/16/2017	Liz Fletcher	288 Marcel Road	Mason, NH 03048	NH	lizfletcher@jacqcad.com		
113	10/17/2017	Peter Wotowiec	425 Cold River Rd	Langdon 03602	NH	ticonel@gmail.com		
114	10/17/2017	Sandra Hodsdon	310 Baptist Hill Road	Canterbury 03224	NH	Slhodsdon@gmail.com	I view this as a serious health issue as well as an economic answer.	
115	10/17/2017	Patrick M Eggleston	9 Conifer Lane	Amherst 03031	NH	eggleston4444@hotmail.com	Climate change is very dangerous. If we value the lives and well being of the next generation, we will try to phase out fossil fuels as rapidly as we can. We can get enough power from wind and solar to run all of the USA. Wind and solar are creating many new jobs that pay well.	
116	10/17/2017	John Kondos	PO Box 584	Spofford 03462	NH	jkondos@home-efficiency.com	A warming climate brings severe consequences including to maple syrup (quality is already declining), foliage (maples, hemlock and birches are vulnerable), winter sports (shortened winters are already here) and the loss of many species including our iconic moose among many others. More severe storms and droughts increase the risk to lives, property and our economy. WE MUST ACT NOW TO REDUCE GREENHOUSE GAS WARMING.	
117	10/17/2017	Susan Silverman	67 E. Lake Rd.	Fitzwilliam 03447	NH	ssssilverman@gmail.com	Let's catch up with VT!!!	
118	10/17/2017	Rebecca MacKenzie	7 Glenwood Drive	Claremont, NH 03743	NH	reb178@myfairpoint.net	To these petition statements, I add the need for climate justice to hold up those in our beautiful state who are people of color, those living in poverty, the elderly and children, who are first impacted by global warming. The urgency of this matter is paramount. Lives are at stake, as well as our economic viability. Fossil Free 603!	
119	10/17/2017	Barbara Dill	170 packers Falls Rd	Durham 03824	NH	barbaradill@gmail.com		
120	10/17/2017	Mary Hodgman	3146 State Route 114,	Bradford, 03221	NH	nembula2002@yahoo.com		
121	10/17/2017	Grace m Crawford	Chester st	chester 03036	NH	ikonlady.gg@gmail.com		

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	Date	Full Name	Street Address	Town and Zip Code	State	Email address	Comments (optional)	
122	10/17/2017	michelle scott	632 Sand Pit Road	Mason 03048	NH	miscott39@gmail.com	I am committed to support from NH State government to make the forward thinking steps that will give us a real world of safety for our children and grandchildren.	
123	10/17/2017	Lucius M. Nelligan Sorrentino	109 Herrick Road	Lyndeborough 003082	NH	heraclitean@hotmail.com		
124	10/17/2017	Henri Vaillancourt	91 Mill St	Greenville 03048	NH	718nma@surfglobal.net		
125	10/17/2017	Kevin Woolley	17 Route 119 E	Fitzwilliam 03447	NH	27KevinW@Gmail.com		
126	10/17/2017	Katharine Gregg	243 Valley Rd	Mason 03048	NH	kggregg@myfairpoint.net		
127	10/17/2017	Bonnie Welch	248 Nimble Hill Rd	Newington 03801	NH	Bpwelch0917@gmail.com		
128	10/17/2017	Curt Spacht	111 Emerson Ln	Mason 03048	NH	curt.spacht@gmail.com		
129	10/17/2017	Krisan Evenson	38 Thurlow Street	Plymouth 03264	NH	DrKrisan@yahoo.com		
130	10/17/2017	Philip A. Jones	36 Duncan Road	Hancock 03449	NH	pjonessped@gmail.com		
131	10/17/2017	Mari Brunner	129 Howard Street	Keene 03431	NH	mbrunner@antioch.edu		
132	10/17/2017	Suzanne Butcher	44 Felt Road	Keene 03431	NH	SuzanneButcherNH@yahoo.com	I agree with every bullet point, especially carbon pricing!	
133	10/17/2017	Dr Penelope Morrow	36 Richmond st	Portsmouth 03801	NH	Penelmorrow@gmail.com		
134	10/17/2017	Sharon Malt	340 Carley Rd.	Peterborough 03458	NH	Smalt62@gmail.com	New Hampshire does not need more fossil fuel infrastructure, we need clean energy and clean energy infrastructure which translate into jobs and a cleaner, healthier environment for NH families.	
135	10/17/2017	Jonathan S. Ring	71 Park Street	Exeter 03833	NH	jring@jonesandbeach.com	I fully support this movement toward clean energy and renewables !! Thank you.	
136	10/17/2017	Elsa Voelcker	97 Old Pound Road	Antrim 03440	NH	elsav@mcttelecom.com	We must carry on doing what we can to stop climate change.	
137	10/17/2017	Tom Spine	50 Holstein Ave	Londonderry 03053-3912	NH	tom.spine@gmail.com		
138	10/17/2017	Patricia Anastasia	50 Holstein Avenue	Londonderry 03053	NH	patti@pattianastasia.com		
139	10/17/2017	Carol DiPirro	10 Cambridge Dr	Merrimack, 03054	NH	cmdipirro@hotmail.com	NH really needs to support more wind and solar. It promotes more job growth and its cleaner. We should also consider lower electric rates at night to promote electric vehicles.	
140	10/17/2017	D'Vorah Kelley	9 Sugar Maple Lane	Keene 03431-5200	NH	dvorah.kelley@gmail.com		
141	10/17/2017	Andrea Polizos	27 Aldworth Manor Rd	Harrisville 03450	NH	sundog.ap@gmail.com		
142	10/17/2017	Emily Caswell	30 Royal Crest Dr.	Nashua 03060	NH	emilycaswell@comcast.net	Clean energy is good for NH's economy and its families!	
143	10/17/2017	April Walker	659 Darling Hill Road	Greenville 03048	NH	april@morefrogs.com		

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	Date	Full Name	Street Address	Town and Zip Code	State	Email address	Comments (optional)	
144	10/17/2017	Erin Sandler	9 Summer St	Northwood 03261	NH	ersandleremberley@gmail.com	I was born and grew up in this state. I want New Hampshire to be a place where my kids can live when they grow up. I don't want our state to be covered by the ocean. I don't want our state to be flooded and destroyed by hurricanes. I want this to be a place where I can live the rest of my life and the generations to come can live here too. Let's continue the New Hampshire tradition of independence and make our own power, and let's make it sustainable and clean so that we can pass down our traditions to the generations to come.	
145	10/17/2017	Kristen Snowman-Shelley	25 Scovill Rd.	Walpole 03608	NH	ksnowmanshelley@gmail.com	It is incredibly important for New Hampshire to take the lead in committing to 100% Renewable Energy by 2050 to protect our health and well being!	
146	10/17/2017	Dorothy Currier	99 Clinton St	Concord 03301	NH	dorocurr@gmail.com	Drastically reduce CO2 emissions. We are almost out of time. It's not necessary to leave catastrophe as your legacy to your children. Wake up!	
147	10/17/2017	John Dwight Schenk	44 Mountain Road	Rindge 03461	NH			
148	10/17/2017	Lucia H Savage-Reeder	23 Bennett Way	Newmarket 03857	NH	lusavreeder@gmail.com		
149	10/17/2017	Ian Blackman	48 Blackman Rd.	Chichester, 03258	NH	blackman@tds.net		
150	10/17/2017	Deborah Bruss	17 Springfield St	Concord 03301	NH	deborahbruss@mac.com	Our state has the opportunity to be a leader as we become energy independent , create jobs, and produce non-carbon based energy.	
151	10/17/2017	Louise Spencer	3 Kent Street	Concord 03301	NH	kentstusa@aol.com		
152	10/17/2017	Candy Woodbury	37 McCurdy Rd.	New Boston, 03070	NH	2cw1946@gmail.com		
153	10/17/2017	Dan Hubbard	49 Ten Rod Road	Rochester 03867	NH	danielhubbard@peoplepc.com		
154	10/17/2017	Doreen V. Bongiovanni	444 N State St. Apt 4	Concord 03301	NH	dori425@msn.com	Please - - we need clean air, clean waters and a beautiful, natural landscape. By investing in the energy of the future we will attract more industry to the state and not only keep many of our young people in NH but will also attract others to come work and live here. I am voting for the environment and I ask you do the same. Peace.	
155	10/17/2017	Aaron Manire	24 Brook Rd.	Mont Vernon, 03057	NH	amanire@yahoo.com		
156	10/18/2017	Christine E Torres	213 Laurel st	Manchester 03103	NH	bmxbadgirl@yahoo.com	Many Blessings!	
157	10/18/2017	Nancy Hokinson	6 Woodland Drive	Amherst 03031	NH	nancy.hokinson@gmail.com		
158	10/18/2017	Betsy Zimmerli	49 Mayflower	Keene 03431	NH	betsyzim@ne.rr.com		
159	10/18/2017	Matthew Oliveira	594 Ashby Road	New Ipswich, 03071	NH	moliveira@trcsolutions.com		

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	Date	Full Name	Street Address	Town and Zip Code	State	Email address	Comments (optional)	
160	10/18/2017	Nicole Demarest	288 Church St.	Keene, 03431	NH	joenicki@gmail.com	Make NH 100% renewable by 2050.	
161	10/18/2017	Heather Stockwell	Main St	Dublin 03444	NH	mosaicmom1@hotmail.com		
162	10/18/2017	Patricia. Stefanko	425 Cold River Rd.	Langdon 03602	NH	T8588@hotmail.com	Extraction, transportation and burning of fossil fuels has contributed largely to the climate crisis. It's time to devote ourselves to better, cleaner, healthier options. Anything less is just insane.	
163	10/18/2017	Michele Chalice	25 Beech St.	Keene 03431	NH	michele.chalice@gmail.com	Your bold foresight has the potential to propel New Hampshire back to the forefront through the plethora of well-paying jobs that a progressive energy plan will create and the increased prosperity that dramatically more efficient energy usage can offer to all the state's residents and businesses.	
164	10/18/2017	Marcia Patten	146 Hancock Road	Peterborough, NH 03458	NH	ramvpatten@comcast.net		
165	10/18/2017	Jared Hardner	15 Woodland Drive	Amherst 03031	NH	jared.hardner@gmail.com	Let's make some progress!	
166	10/18/2017	Susan Covert	31 Cottage Street	Hopkinton 3229	NH	scovert@comcast.net		
167	10/18/2017	Nancy Brigham	37 Beaver St.	Keene, 03431	NH	npbrigham@gmail.com	Excellent petition! Thank you!	
168	10/18/2017	David N. Pyles	82 Lead Mine Road	Nelson 03457	NH	dnpyles@acousticmusic.com		
169	10/18/2017	Rhoda Capron	311 Stage Rd	West Nottingham 03291	NH	rhoda0607dc@gmail.com	Taking these measures will help give our children and children a chance for a better future.	
170	10/18/2017	Martha Reinhardt	79 Horse Corner Road	Chichester 03258	NH	reinhardt40@comcast.net		
171	10/18/2017	Emily Hinton	4 2nd St.	Bedford 03110	NH	ehinton_77@hotmail.com		
172	10/18/2017	Susan F. Richman	16 Cowell Drive	Durham 03824	NH	susan7richman@gmail.com	This is urgent! We must reverse climate warming NOW.	
173	10/18/2017	Mary L. Johnson	301 Warwick Rd.	Winchester 03470	NH	zimhost@gmail.com		
174	10/19/2017	Nancy Pape	57 Nute Rd	Madbury 03823	NH	nancy-pape@comcast.net		
175	10/19/2017	Nancy Kelley-Gillard	72 Reseroir St.	Keene 03431	NH	ndgillard@ne.rr.com		
176	10/19/2017	Catherine Bushueff	22 Ridgewood Road	Sunapee 03782	NH	agawamdesigns@gmail.com		
177	10/19/2017	Edward R Green	10 Glen Drive	Hampstead 03841	NH	edgreen1950@msn.com		
178	10/19/2017	Doug Bogen	21 Lois Lane	Barrington 03825	NH	dbogen@metrocast.net		
179	10/19/2017	Kristen Palleiko	545 Silver Street	Rollinsford, 03869	NH	kw.palleiko@gmail.com	We have the opportunity to be the leaders in this technology. We have the infrastructure, the location, and the skilled laborers to do it. This could be a big win for NH – financially and otherwise!	
180	10/19/2017	Maggie Morrison	20 Wiswall Road 03824	Durham 03824	NH	maggie.morrison73@gmail.com		
181	10/19/2017	Devi Lockwood	24 Surrey Ln	Durham 03824	NH	devi.lockwood@gmail.com		

Signatures on the Petition Calling for a Great State Energy Strategy for New Hampshire

	Date	Full Name	Street Address	Town and Zip Code	State	Email address	Comments (optional)	
182	10/19/2017	Bonnieta Melodie Kraft	23 Douglass Street	Keene 03431	NH	bonkraft@myfairpoint.net		
183	10/20/2017	Mary deGozzaldi	19 Mount Gilboa Rd	Westmoreland, 03467	NH	mdegozzaldi@gmail.com		
184	10/20/2017	Elizabeth Attridge Melville	1A Indian Cave Landing	Sunapee 03782	NH	melville.elizabeth@gmail.com		
185	10/20/2017	Bonnie Lee Husband	14 Parkhurst Street #10	Lebanon 03766	NH	Gumbycake@gmail.com		
186	10/20/2017	Scott Stone	9 High ST APT 111	Lebanon 03766	NH	blackburybunny@gmail.com		
187	10/20/2017	Amy McIntyre	26 Barker Street	Keene 03431	NH	amynbill@ne.rr.com	Renewable energy makes economic and environmental sense, and is the only path forward to a sustainable future for ourselves and future generations.	
188	10/20/2017	Rona Beame	49 Prospect Hill Road	Hancock, 03449	NH	Ronabeame@hotmail.com	I would be so proud of our state if it would join the U.S. Climate Alliance. Renewable energy is economical as well as good for the planet and the people who live on it.	
189	10/20/2017	Andrea Murphy	41 Water Street	Epping 03042	NH	hcds@comcast.net		
190	10/20/2017	Martha Clark	210 Morrill Rd	Canterbury 03224	NH	mctraveler1@comcast.net	NH needs to continue to move forward with promotion of renewable energy and the the jobs created with renewables.	
191	10/21/2017	Lynn Merlone	28 Jowders Cove Road	Rindge 03461	NH	prulon@gmail.com		
192	10/21/2017	Katharine Gage	12 Fordway Extension	Windham, 03087	NH	katharine.gage@gmail.com		
193	10/21/2017	Stephanie M. Husband	10 Mallard Ct.	Litchfield 03052	NH	pmaadmu@gmail.com	We are a sensible people here in the Granite State. Continued reliance on fossil fuels makes no sense economically or ethically as we see the increasing impacts of climate change. We can and should become leaders and job creators in the burgeoning renewable energy industries; let's be visionaries and stop subsidizing corporations that only exist to make a buck on our backs without a single care for the grievous, immediate harm that their dirty energy is causing to our health and our planet.	
194	10/21/2017	Taylor Duckworth	9 Four Winds Rd	Merrimack 03054	NH	tducky12@gmail.com		
195	10/21/2017	Dori Drachman	95B Steele Rd.	Peterborough 03458	NH	dori.drachman@gmail.com	It's crucial that New Hampshire adopt an energy policy that moves us forward to a livable future. Such a policy will also protect so much of what makes NH unique - beautiful fall foliage, abundant snow for skiing, maple sugaring, etc. Lives and livelihoods depend on smart policies that move us toward 100% renewable energy sources.	
196	10/22/2017	Lance Messinger	58 Baptist Hill Rd	Canterbury 03224	NH	lan10@comcast.net		

Signatures on the Petition Calling for a Great State Energy Strategy for New Hampshire

	Date	Full Name	Street Address	Town and Zip Code	State	Email address	Comments (optional)	
197	10/22/2017	Gerald Beck	113 Sargent Rd	Holderness 03245	NH	bentrimone@gmail.com		
198	10/22/2017	Ginny Litalien	73 Old Tilton Rd.	Canterbury, 03224	NH	ginnyatmaples@gmail.com	This is essential and urgent!!!	
199	10/23/2017	Hallel Parsons	208 Middle Winchendon Rd	Rindge 03461	NH	ha77e7@gmail.com	In our everyday lives; it's very hard to step back and examine our perspectives with an open mind. When the physical environment is changing around us; it's very easy to keep on doing what we've always been doing. If we do not adapt, the harvest will be unbearably bitter. We need to support each other most when it feels like every little thing we do and decision we make is imminently magnified into something of the utmost seriousness and urgency.	
200	10/23/2017	SUSAN HAYES	1675 ROUTE 9	STODDARD, NH 03464	NH	RBRANDALL@YAHOO.COM		
201	10/23/2017	Lee Garland	69 Prospect Street, PO Box	Harrisville 03450	NH	leegarland03458@gmail.com		
202	10/23/2017	Karen Fitzgerald	1222 Bennington Rd.	Francestown 03043	NH	kfitzgerald1222@gmail.com		
203	10/23/2017	Susan martin	19 Lookout Hill Rd	Peterborough 03458	NH	Smartinnh@gmail.com		
204	10/24/2017	Maria Niswonger	8 Strout Ln	Durham 03824	NH	Mnww2@comcast. Net		
205	10/24/2017	William Daniel Gillard	72 Reservoir St.	Keene 03431	NH	ndgillard@ne.rr.com		
206	10/24/2017	Sylvie Stewart	44 Spring Cove Road	Nashua 03062	NH	shs_allareone@comcast.net	Please follow these recommendations. Our climate situation is dire.	
207	10/24/2017	Tory McCagg	8 Turner Road	Jaffrey 03452	NH	tory@bluesbone.com		
208	10/24/2017	Sara R Timmons	95 Fletcher Farm Rd	Greenfield 03047	NH	Saratimmons@gmail.com		
209	10/24/2017	Danielle Baudrand	19 Bridge Ct	Keene 03431	NH	deebaudrand@gmail.com		
210	10/24/2017	Ann Hayashi	98 Zephyr Lake Road	Greenfield 03047	NH	hayamatt@aol.com		
211	10/24/2017	Kathleen Chapman	111 emerson lane	Mason 03048	NH	chapman.kathy@gmail.com		
212	10/24/2017	Carolyn B Jones	14 Monadnock Street	Keene 03431	NH	carolynj1947@gmail.com	I feel that this is the most important topic that we need to be working towards.	
213	10/24/2017	sharman Howe	241 old harrisville rd	marlborough 03455	NH	sharmanhowe@gmail.com		
214	10/24/2017	Nora Traviss	528 Marlboro St	Keene 03431	NH	ntraviss@gmail.com	It's time for NH to be part of a clean, low carbon energy future that grows jobs in the renewable energy sector for our state.	
215	10/24/2017	Marsha Morrow	11 Contoocook Lane	Peterborough 03458	NH	morrowmarsha1@gmail.com		

Signatures on the Petition Calling for a Great State Energy Strategy for New Hampshire

	Date	Full Name	Street Address	Town and Zip Code	State	Email address	Comments (optional)	
216	10/24/2017	Emily Manns	40 High St	Peterborough 03458	NH	ecmanns@gmail.com	Future electric vehicles will be solar and self-driving as well. They will power themselves, charge their own batteries, and produce energy into the grid when plugged in on sunny days, the excess of which will go into battery storage, as well as draw energy sometimes. The future is here, and we need to end ratepayer funded long-term commitments to fossil resources. Shareholders can take the risks if they want to.	
217	10/24/2017	Michele Chalice	25 Beech St.	Keene 03431	NH	michele.chalice@gmail.com	We have a tremendous opportunity to create well-paying jobs for new, millennial workforce in our state with these goals.	
218	10/24/2017	Susan Lefferts	126 Gunn Rd	Keene 03431	NH	imacalamity@gmail.com		
219	10/24/2017	Wendy MacMullan Pearre	191 Mason Road	Harrisville 03450	NH	Wpearre3@gmail.com	Let's stop playing politics and instead, do what is best for the people and the planet on which we live.	
220	10/24/2017	Kyle McAdam	44 Province Rd	Gilmanton 03220	NH	kylejmcadam@gmail.com	New Hampshire, her ten counties, her cities, towns, villages, businesses and private residents should do all that can reasonably be done to get New Hampshire off of fossil fuels and onto renewable energy as much as possible as quickly as possible. New Hampshire should follow the Paris Agreement and the Clean Power Plan as part of our Clean Energy Strategy.	
221	10/24/2017	Catherine S. Carleton	36 Grove Street 3A	Peterborough 03458	NH	kiticar@gmail.com		
222	10/25/2017	richard s. carvalho	150 rivermead rd apt 232	peterborough 03458	NH	carvalhodick@gmail.com		
223	10/25/2017	Marilyn Nash Wilking MD	52 Stevens Lane	Walpole 03608	NH	mnwilking@gmail.com		
224	10/25/2017	Catherine Sage	47 Westview Dr	Peterborough 03458	NH	Sagewt@gmail.com		
225	10/25/2017	Thor Thomforde	Darling Hill Rd	Greenville, 03048	NH	thor@morefrogs.com		
226	10/25/2017	ANN SHEDD	59 GREENWOOD AVE	KEENE 03431	NH	LADYLEAFY@GMAIL.COM		
227	10/25/2017	Mark Meess	59 Greenwood Ave	Keene 03431	NH	1nhmoose@gmail.com		
228	10/25/2017	Louisa Thoron, M.D.	139 Harkness Road	Jaffrey and 03452	NH	Lthoron@myfairpoint.net		
229	10/26/2017	Terry Reeves	53 Old Jaffrey Road	Peterborough 03458	NH	terryhelenreeves1953@gmail.com	We need to move more urgently to renewables now.....	
230	10/26/2017	Kira Heeschen	309 Pearl Street	Keene 03431	NH	kbheeschen@gmail.com		
231	10/26/2017	Steve Holmgren	20 Perley Lane	Durham, 03824	NH	sholmgren2@outlook.com		
232	10/26/2017	Pamela Florissant	188 Southwest Rd	Canterbury, 03224	NH	pforissant@gmail.com		
233	10/26/2017	Angela Jenkins	53 S. Main St., Apt. 4A	Concord, 03301	NH	ajenkins020@outlook.com, angelabjenkins@outlook.com		
234	10/27/2017	CLAUDE PELTZ	70 BLOSSOM RD	WINDHAM 03087	NH	peltzfinancialservices@gmail.com		

Signatures on the Petition Calling for a Great State Energy Strategy for New Hampshire

	Date	Full Name	Street Address	Town and Zip Code	State	Email address	Comments (optional)	
235	10/27/2017	Arthur Dwight Baldwin, Jr.	6 Fairchild Drive	Durham 03824	NH	dbbaldwin@comcast.net		
236	10/28/2017	Donald Leisman	523 North Pembroke Road	Pembroke 03275	NH	Dleisman1@yahoo.com		
237	10/28/2017	Tyler McFarland	East Watson	Dover 03820	NH	Tmcfarlandlcv@gmail.com	Screw Exxon	
238	10/28/2017	Ted Vansant	362 East Holderness Road	Holderness 03245	NH	Tedvansant@gmail.com		
239	10/28/2017	Kathleen Meighan	8 Circle Drive	Hudson 03051	NH	K.funkyfish@gmail.com		
240	10/28/2017	Carol Sullivan	Po Box 1044	Center Harbor 03226	NH	Sullc777@yahoo.com		
241	10/28/2017	Joan C. Pratt	7 Wentworth St.	Exeter, 03833	NH	jprattnh@gmail.com		
242	10/29/2017	Doris J. Hampton	38 Borough Road	Canterbury 03224	N.H.	dmlr1@myfairpoint.net	It is so critical to our future that we do all we can to support renewable energy and conservation of our precious resources and earth.	
243	10/29/2017	Chris Moore	9 Cypress Street	Concord 03301	NH	Fliprollflop@gmail.com		
244	10/29/2017	Suzanne E Gray	180 Upper Troy Road	Fitzwilliam 03447	NH	suzanne.gray@comcast.net	I am a resident of NH and I also own a small business in NH.	
245	10/29/2017	Sebastian Barthelmess	424 Temple Road	New Ipswich	NH	seb@latestlinux.com	New Hampshire needs to become the leader in the US for clean energy (please remember "natural gas" is NOT clean).	
246	10/29/2017	Karen Geiling	19 Hollenbeck Lane	Hanover 03755	NH	kgeiling@comcast.net	As a business owner and resident of NH, I encourage ALL of us to commit to a goal of 100% renewable energy and in so doing reject the expansion of natural gas in our state. Let's be leaders in this movement combating climate change and promoting responsible sustainable energy sources.	
247	10/29/2017	Lorraine Tompkins Kelly	25 Wildwood Drive	West Lebanon 03784	NH	ltompkinskelly@gmail.com	There is no issue more important than environmental protection, for us, for our children, for the planet. Please, New Hampshire, don't be an adversary, LEAD THE WAY FORWARD to a sustainable future.	
248	10/29/2017	Perry Williamson	7 River Ridge Rd	Hanover 03755	NH	Perryfw@mac.com		
249	10/29/2017	John Stephenson	8 Black Hill Road	Plainfield 03781	NH	Janekate@aol.com		
250	10/29/2017	George James morgan jr	17 woodock lane	Etna, nh. 03750	Nh	Gjmorgan47@gmail.com		
251	10/29/2017	Peter W. Majoy	143 S. Lincoln St.	Keene, 03431	NH	ptmjoy@gmail.com	Yes, New Hampshire must move forward in its opposition to fracked gas, gas pipelines and dependence on fossil fuel.	
252	10/29/2017	Tim Winship	258 Cutter Rd.	Temple 03084	NH	tim@newfieldfarm.com		
253	10/29/2017	Kathleen Gauvin	61 Beechwood Rd	New Ipswich 03071	NH	kgauvin61@comcast.net		
254	10/29/2017	Kimberley Quirk	78 Main St	Enfield, 03748	NH	kim.quirk@gmail.com	I am also a business owner in NH.	

Signatures on the Petition Calling for a Great State Energy Strategy for New Hampshire

	Date	Full Name	Street Address	Town and Zip Code	State	Email address	Comments (optional)	
255	10/30/2017	Lee Walker Oxenham	92 Methodist Hill Road	Plainfield 03781	NH	Lee.Oxenham@leg.state.nh.us		
256	10/30/2017	Patricia McGovern	14 Green St.	Lebanon 03766	NH	mcgovern.patricia@gmail.com		
257	10/30/2017	Richard DuMez	78 Main Street	Enfield 03748	NH	dumezr@gmail.com		
258	10/30/2017	Lawrence A. Kelly	25 Wildwood Drive	West Lebanon 03784	NH	larryajkelly@gmail.com		
259	10/30/2017	Christine McKenna	13 Maple Street	Hanover. 03755	NH	tompkinschr@msn.com		
260	10/30/2017	Peter C. Paquette	5 Dana Road	Hanover 03755	NH	peter.paquette@tarndale.com	The State of NH needs to plan an energy strategy for the future, not regurgitate the fossil fuel policies of the past.	
261	10/30/2017	Margaret Foxweldon	165 S. Lincoln St.	Keene, 03431	NH	foxwel@yahoo.com	Support solar and wind, but fracking and damage to the earth and the health of those who live here can't be compromised with the results of fracking!(PLEASE!)	
262	10/30/2017	Sarah McArdle	11 Pinewood Village	West Lebanon 03784	NH	Stmcardle@gmail.com		
263	10/30/2017	Grace Gallaway	25 Pinewood Village	West Lebanon 03784	NH	gigimurphy@mac.com	BE SUSTAINABLE!!!	
264	10/30/2017	Thomas Kehler	5 River Ridge Road	Hanover 03755-1910	NH	tkehler@surnet.cl		
265	10/30/2017	Jan Bent	3 Pinewood Village	West Lebanon 03784	NH	bjan324@gmail.com		
266	10/30/2017	Anne S Segal	80 Lyme Road	Hanover 03755	NH	asegal@kahres.org		
267	10/30/2017	Joann Onacki	1 Pinewood Village	West Lebanon 03784	NH	zjoancki@gmail.com		
268	10/30/2017	Anita Gonzalez	3 Bridge Street	Enfield 03748	NH	ag.energyemp@gmail.com		
269	10/30/2017	Frances C. Brokaw	4 Stonehurst Common	Hanover 03755-3232	NH	fran.brokaw@gmail.com		
270	10/30/2017	Devin Wilkie	40 Mascoma Street	Lebanon 03766	NH	devin.wilkie@gmail.com		
271	10/30/2017	Wayne Gersen	59 Dogford Road	Etna, 03750	NH	wgersen@hotmail.com	We don't need any natural gas as a "bridge"... we would be far better off going directly to wind and/or solar	
272	10/30/2017	Amanda Plagge	14 Woodcock Ln	Etna NH 03750	NH	amanda.plagge@gmail.com		
273	10/30/2017	Nicholas Warren	84 Mascoma St #1	Lebanon 03766	NH	warrn.nicholas.jh@gmail.com		
274	10/30/2017	Armin Helisch	29 Evenchance Road	Enfield, 03748	NH	a.helisch@gmail.com		
275	10/30/2017	Rebecca Kvam Paquette	5 Dana Road	Hanover 03755	NH	Rebecca.k.paquette@gmail.com		
276	10/30/2017	Jonathan Chaffee	21 Highland Ave.	West Lebanon, 03784	NH	jonathan.chaffee@valley.net		
277	10/30/2017	Thomas Vansant	362 East Holderness Road	Holderness, 03245	NH	tedvansant@gmail.com		
278	10/30/2017	Rona Beame	49 Prospect Hill Road	Hancock 03449	NH	Ronabeame@hotmail.com		
279	10/30/2017	Sara Evangelos	2 Juniper Lane	Hanover 03755	NH	spedit@comcast.net		
280	10/30/2017	Terri O'Rorke	34 Hillside Ave.	Keene 03431	NH	terrio21@yahoo.com		
281	10/30/2017	Anne Thomas	15 Todd Hill Road	Rindge 03461	NH	annekerosie@gmail.com	Please make this the top priority it needs to be. Cost saving in the long run.	

Signatures on the Petition Calling for a Great State Energy Strategy for New Hampshire

	Date	Full Name	Street Address	Town and Zip Code	State	Email address	Comments (optional)	
282	10/31/2017	Mark Duckworth	9 Four Winds Rd	Merrimack 03054	NH	mrducky@gmail.com		
283	10/31/2017	Dana Nute	115 Weeks Rd	Sanbornton, 03269	NH	dnute@resilientbuildingsgroup.com		
284	10/31/2017	Dovev Levine	96 Woodlawn Circle	Portsmouth, 03801	NH	Dovev.Levine@gmail.com		
285	10/31/2017	Evan A Oxenham	92 Methodist Hill Road	Plainfield 03781	NH	evan.oxenham@gmail.com		
286	10/31/2017	William Thomas	15 Todd Hill Rd.	Rindge 03461	NH	bill@williamthomas-furniture.com		
287	10/31/2017	Albert S Pratt III	24 Gingras Drive	Nashua 03060	NH	sampratt2@gmail.com		
288	10/31/2017	Victoria Parmel	6 Pleasant View Ave	Northwood 03261	NH	vistas20@fastmail.com		
289	10/31/2017	Yolanda Baumgartner	1 Lindy Lane	Hanover 03755	NH	ybaumgartn@aol.com		
290	10/31/2017	Dick Devens	78 Maple St	Center Sandwich 03227	NH	rdevens41@gmail.com	This is important to me.	
291	10/31/2017	virginia heard	51 coolidge farm road	sandwich 03227	new h	vlheard151@gmail.com	It is imperative that we increase use of renewable energy by all means possible - in order to reduce carbon emissions and reduce climate warming.We do not have much time left.	
292	10/31/2017	Katherine J. Downs	92 Cove Rd	Center Sandwich 03227	NH	Katherinedowns@mac.com		
293	10/31/2017	Siena Kaplan-Thompson	83 Chocorua Road	Tamworth, 03886	New H	sienak@gmail.com	I would add prioritizing passenger rail development and local public transportation, and encouraging other forms of transportation such as biking, walking.	
294	10/31/2017	Abby Evankow	6 Loups Garou Rd	Gorham, NH 03581	NH	abbyaustin@myfairpoint.net	I completely agree with the position of the Citizen's Climate lobby. We need to look towards a healthy, clean, sustainable energy future. Such policies will be a benefit to all our residents.	
295	10/31/2017	David Evankow	6 Loups Garou Rd	Gorham, 03581	NH	devankow@myfairpoint.net	I would like to see a smart grid implemented along with the renewables and energy efficiency measures. This is an investment in our future.	
296	10/31/2017	Eva Goss	57 Wentworth HIll Rd	Sandwich, 03227	NH	mgpratt@juno.com		
297	10/31/2017	John Coolidge	35 Hicks Hill Rd	Ashland 03217	NH	jcoolidge@att.net		
298	10/31/2017	David F. White	150 Middle Road	Center Sandwich 03227	NH	whitesforestfarm@gmail.com		
299	10/31/2017	Janis M Sutherland	156 upper Road	Center Sandwich 03227	NH	Muirhouse@gmail. Com		
300	10/31/2017	Linda Kipnes	23 Nathaniel Drive	Hudson 03051	NH	lindakipnes@gmail.com		

Signatures on the Petition Calling for a Great State Energy Strategy for New Hampshire

	Date	Full Name	Street Address	Town and Zip Code	State	Email address	Comments (optional)	
301	10/31/2017	Tim Miner	106 Miner Rd.	Ctr. Sandwich, 03227	NH	timaminer1@gmail.com	Failure to aggressively pursue the priorities presented in this petition will jeopardize the human habitability of our planet and the natural systems to which all living species have adapted, and are an integral part of. As well, if our State does not adopt these policies we will cede vital economic advantages to those with the foresight to realize that the competitive edge will belong to those who have made an energy efficient economy powered by renewable energy sources their highest economic priority. Any other path presents a clear and imminent danger to the welfare of our citizens and the health of our economy.	
302	10/31/2017	Christopher Morgan	387 Great Hill Road	Tamworth 03886	NH	Kitm@comcast.net		
303	10/31/2017	Patricia Slothowrr	106 miner road	Center Sandwich	NH	patsyslothower@gmail.com		
304	10/31/2017	Mary Michele Sopher	38 Grove Road	Rye 03870	NH	sopherenergy@gmail.com		
305	10/31/2017	Marc D. Sopher	38 Grove Road	Rye 03870	NH	mdsophermd@comcast.net		
306	10/31/2017	Jeffrey Lathrop	288 Echo Acres Rd.	North Conway 03860	NH	jtlathrop68@gmail.com	I generate 100% of the electric power I need with a PV system, heat primarily with a high efficiency outdoor wood furnace, and use a minisplit heat pump. These have been highly cost effective and I highly recommend each of these.	
307	10/31/2017	Richard Stuart	677 SQUAM LAKE RD	SANDWICH 03227	NH	randrstuart@gmail.com		
308	11/1/2017	Laurie Nason	24 Hidden Rd	Tamworth 03886	New I	sashi8u@yahoo.com		
309	11/1/2017	Francesca Priestman	50 Main Street	Tamworth 03886	NH	tinyfranklin@gmail.com	Renewable Energy has my vote.	
310	11/1/2017	margaret Longley	86 n sandwich rd	sandwich 03227	NH	peggylongley@sbcglobal.net		
311	11/1/2017	Ian Oxenham	92 Methodist Hill Road	Plainfield 03781	New I	ian.r.a.oxenham@gmail.com		
312	11/1/2017	Lisa Heard	P.O. Box 141	Center Sandwich 03227	New I	lisahearddonald@gmail.com		
313	11/3/2017	Barbara L. Harlow	12 Union Street	Peterborough 03458	NH	bds1222@hotmail.com		
314	11/4/2017	George Saunderson	615 Lovejoy Road	Loudon, 03307	N.H.	saunderson@myfairpoint.net	This is really important for New Hampshire	
315	11/5/2017	Cecily Bastedo	80 Cobb Meadow Road	Dublin 03444	NH	cbaste@juno.com		

Good morning OSI Director and Staff. Please accept my attached comments.

Best regards,

Ted Vansant
New England Commercial Solar Services
Office 603-968-7359
Mobile 603-387-9577
ted@necsolarservices.com

New England Commercial Solar Services
LOCALLY SOURCED • TRUSTED • EXPERIENCE
necsolarservices.com

November 6, 2017

Office of Strategic Initiatives
107 Pleasant Street
Concord, NH 03301

Dear OSI Director and Staff, please accept my comments/suggestions for updating the NH 10-year energy strategy.

Energy Strategy Comments

Currently our state is sending the wrong signals to the Renewable Energy investment community who have billions of dollars to invest here;

- Each legislative cycle there are numerous proposed pieces of legislation aimed at reducing implementation of renewable energy projects.
- REC prices are very low making it hard for projects to get financed
- and our Renewable Energy Fund is closed due to lack of funds.

Since the energy strategy was developed in 2014 several things have happened with regards to technological and consumer preferences that trend toward electrification of our state much more quickly than could have been anticipated three years ago including;

- Much faster adoption and development of Electric vehicles worldwide
- Significant opportunity to switch to LED lighting across all sectors.
- Drop in solar costs and dramatic increase in implementation of solar projects.
- Very few technical barriers in the ability to implement distributed solar at all levels from residential to utility scale.
- Much faster adoption of heat pumps for heating and cooling due to dropping costs, increase in consumer recognition and efficiency increases.
- Promising battery technologies that will be available and will start to be implemented between now and the next three year update of the energy strategy.

This trend allows us to very quickly and relatively inexpensively make the switch from fossil fuel energy use to electricity. At the same time we have the ability at many levels to generate 100% or more of our electric load on site at our home, business, school, non-profit or town, primarily from solar energy because of the flexibility, ease and speed of deployment.

The benefits of this electrification to the state of NH are numerous including;

- Reduce air pollution due to lower emissions from fossil fuel electricity plants. This means less ashthma, lung cancer, heart disease, etc. etc.

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- Reduce air pollution due to switch from internal combustion engines to electric motors for transportation, lawn care and landscaping, etc.
- Less carbon emissions
- Increase in high-paying jobs in the Renewable Energy and Clean Tech Sector
- Ability for towns, schools, the state, residents and businesses to generate their own energy and reduce and control their own energy costs. This results in lower taxes for all
- These benefits are income-level neutral, everyone benefits from lower taxes and lower pollution.

While this shift toward electrification and solar/renewable generation is happening quickly there is still a need to dramatically increase energy efficiency measures in parallel with fuel shifting and solar generation.

Suggestions for changes to Energy Strategy to promote Solar/Renewable Energy and Efficiency;

1) Utilize existing expertise and resources - Work with NHSEA and other organizations that have developed demonstrated expertise with Renewable Energy and/or Efficiency policy and implementation.
2) Siting –**Create model zoning ordinance** that towns can use without having to recreate the wheel when they are considering siting of an RE Project that does not fall under SEC jurisdiction (smaller than 30MW).
3) Taxation – **Create a model PILOT taxation ordinance** so that developers and owners of RE projects know what their tax cost is from town to town and so that towns don't have to determine on their own what is a reasonable tax rate.
4) Solar Incentives – Although solar PV costs have dropped dramatically there is still need for incentives to help homeowners and businesses achieve a payback that is attractive. The current funding mechanism for the NH PUC rebate program (both residential and C&I) is erratic and provides dramatically insufficient funding. **Our state needs an incentive program that has consistent and reliable funding and a mechanism that decreases that incentive amount as solar installation costs decrease ideally with a sunset clause where in 10(?) years there is no more program because there is no need.**
5) Grid Modernization -

All actions are underscored by the need for ongoing policy stability, support, and consistency that best enables businesses and consumers to plan, invest, and make informed decisions.

The strategies above must be underscored and realized through strong leadership and management, and given a sense of immediacy by adoption of an ambitious *action* strategy. **The strategy and the resulting actions must implicitly and explicitly create impacts that prove as resilient as possible through each biennial political shift.** We recommend the following operational strategy for the next two years of the ten year strategy, which includes a legislative agenda, executive orders and private market action.

- RPS housekeeping legislation to bring ACP rates up to comparable levels with the rest of the New England ISO-NEPOOL GIS territory, which would allow REC prices to send the appropriate market signals and incent new generation.

- Executive and legislative leadership to support creation of a Clean Energy Finance Authority and private sector coordination/investment participation therein.
- Executive leadership convening finance forums on clean energy financing and investment strategies.
- Legislative action to adopt CA-LEV and CA-ZEV standards.
- PUC-led coordination among DOT, PUC, DES, distribution utilities, and private entities to enable grid modernization efforts and electric vehicle charging infrastructure planning and construction.

Sincerely, Ted Vansant, President

Attached please find Conservation Law Foundation's comments relative to the New Hampshire 10-Year State Energy Strategy, together with a zip file containing accompanying attachments.

Please contact me if you have any difficulties with either of these files, or if you have any questions.

Kind regards,

Dorene Hartford
Office Manager
CLF New Hampshire

27 North Main Street
Concord, NH 03301-4930

P: 603-225-3060
E: dhartford@clf.org

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For a thriving New England

CLF New Hampshire
27 North Main Street
Concord, NH 03301
P: 603.225.3060
F: 603.225.3059
www.clf.org

October 31, 2017

Director Jared Chicoine
Office of Strategic Initiatives
107 Pleasant Street
Johnson Hall, 3rd Floor
Concord, NH 03301

Dear Director Chicoine:

Conservation Law Foundation appreciates the opportunity to submit written comments on the New Hampshire 10-Year State Energy Strategy. In the three years since the current Energy Strategy was launched, the state has made strides forward in a number of important areas outlined in the strategy, including energy efficiency, grid modernization, and distributed generation. It is a credit to the hard work of the state and numerous stakeholders, including consumer and low-income advocates, as well as the New Hampshire utilities, that we have achieved a number of the milestones set out in 2014. It is also clear that the transformation of the energy industry continues at a rapid pace. In order to avoid falling behind, New Hampshire must continue a rapid forge ahead. Consequently, certain updates and amendments to the strategy may be appropriate.

These comments are not intended to be comprehensive. We believe that the state can fruitfully continue many of the efforts already identified in the State Energy Strategy, including, for example, completing the grid modernization efforts underway at the Public Utilities Commission. In these comments we highlight just a few areas where the state stands well-positioned to capitalize over the next 5-10 years. However, we would be glad to engage in a broader conversation should your office decide to move forward with revisions to the strategy.

In the event that the Office of Strategic Initiatives decides to move forward with revisions to the New Hampshire 10-Year State Energy Strategy, we urge a transparent and inclusive process for developing updates to the energy strategy, consistent with the process carried out in 2013 and 2014, which included the convening of an advisory council and solicitation of comments on the non-final draft strategy document.

CONSERVATION LAW FOUNDATION

CLF is New England's leading environmental advocacy organization. We are a nonprofit, non-partisan, member-supported organization with offices throughout New England. CLF has thousands of contributing members across the region, including New Hampshire. Since 1966, CLF has worked to protect New England's people, natural resources, and communities. CLF

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promotes clean, renewable, and efficient energy production and use throughout New England and has substantial experience and deep expertise in this field.

Consistent with its mission to promote thriving, resilient communities, CLF is dedicated to advancing solutions that strengthen New England's – and New Hampshire's – environmental and economic vitality. To this end, CLF has developed extensive expertise concerning energy projects, markets, and regulatory policy. As a participant in the NEPOOL stakeholder process, CLF has participated in the formation and refinement of New England's energy markets and planning of the region's electric transmission grid. CLF's involvement in New Hampshire energy matters, including but not limited to proceedings before the Public Utilities Commission and the Site Evaluation Committee, has spanned the past two decades and includes intervention and participation in numerous dockets such as Public Utilities Commission Docket Nos.: DR 97-211, DE 01-057, DE 07-064, DE 08-103, DE 08-145, DE 09-033, DE 10-160, DE 10-188, DE 11-215, DE 11-250, DE 13-108, DE 13-275, DE 14-120, DE 14-238, DE 15-124, IR 15-072, IR 15-124, IR 15-137, IR 15-296, DE 16-241, DE 16-576, and DE 17-136.

CLF previously submitted comments on the May 1, 2014 draft New Hampshire 10-Year State Energy Strategy. Those comments were dated July 25, 2014.

COMMENTS

CLEAN ENERGY JOBS MEAN LOCAL JOBS

Clean, local energy brings well-paid, local jobs. What's more, these jobs are well-suited to New Hampshire's younger generation, helping to maintain New Hampshire's vibrant population and its strong tax base. We should prioritize local clean energy resources and jobs over the next decade.

New, large-scale clean energy development is being launched in the state by a number of major energy project investors. New Hampshire can capitalize on both the direct and indirect benefits of that corporate investment trend. Combined, all of the solar projects currently being proposed in New Hampshire will total 210 MW of capacity, triple the state's solar capacity in 2016. NextEra Energy, the largest builder of solar generation in the country, is a key part of that investment trend. Several solar arrays planned by NextEra will eclipse the state's entire current solar output. New Hampshire should continue to support large-scale clean energy development that is consistent with the character of our communities, respectful of our resources, and beneficial to our economy.

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The following chart of proposed large solar projects in New Hampshire was published in the New Hampshire Business Review on October 26, 2017.[1] The chart shows proposed projects in the early stages as well as projects with contracts in place.

Proposed Solar Projects in NH

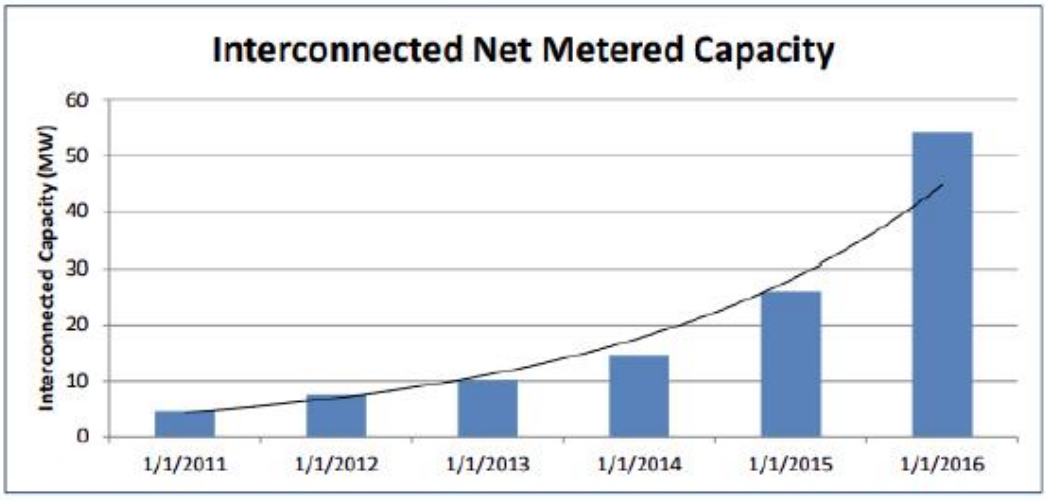
BID/PROJECT NAME	DEVELOPER	LOCATION	CAPACITY	POWER TO	STATUS
Berlin Solar	Freepoint/SunEast	Berlin	20 MW	MA	Bid submitted
Campton 1 Solar	Freepoint/SunEast	Campton	20 MW	MA	Bid submitted
Campton 2 Solar	Freepoint/SunEast	Campton	20 MW	MA	Bid submitted
Thornton Solar	Freepoint/SunEast	Thornton	20 MW	MA	Bid submitted
Peterborough Solar	Freepoint/SunEast	Peterborough	20 MW	MA	Bid submitted
Claremont Solar	Freepoint/SunEast	Claremont	20 MW	MA	Bid submitted
Chariot Solar	NextEra	Hinsdale	50 MW	MA	Bid submitted
Chinook Solar	NextEra	Fitzwilliam	30 MW	MA, CT, RI	Won bid, contract signed
W. Portsmouth Street Solar	NextEra	Concord	10 MW	CT	Won bid, contract signed

Source: Bid documents

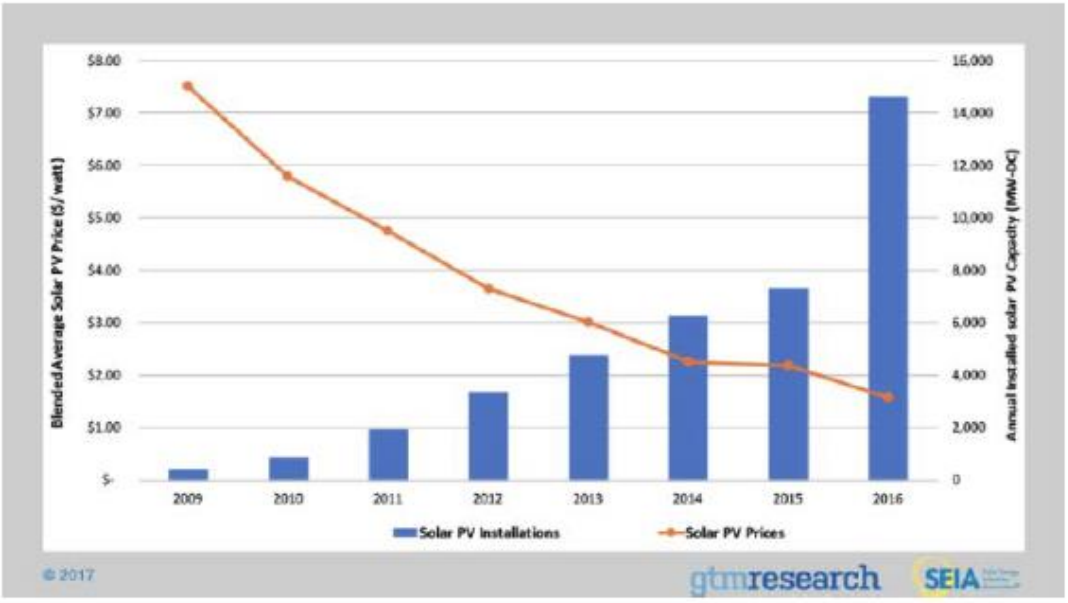
These projects are expected to provide both short-term and long-term jobs, as well as tax revenues.

Distributed generation is also in the early stages of taking off in the state. This industry offers significant cash-flow and is a jobs-creator for New Hampshire. According to the Public Utilities Commission, the state's installed capacity of net metered facilities roughly doubled between January 1, 2015 and January 1, 2016.[2]

[1] http://www.nhbr.com/October-27-2017/Regions-renewable-needs-spark-a-NH-solar-surge/
[2] Annual Report of the New Hampshire Renewable Energy Fund, October 1, 2017, p. 26, available at https://www.puc.nh.gov/Sustainable%20Energy/Renewable%20Energy%20Fund/2017%20REF%20Report%20to%20Legislature.pdf.



This means that there is an increasingly significant number of rooftop solar jobs in the state. This coincides with a nationwide trend that parallels a dramatic drop in the price of solar photovoltaics, as depicted below.



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At the same time, there is substantial room for further job growth. As the Public Utilities Commission explained in the June 23, 2017 net metering order in DE 16-576 (at 72) "the penetration level of DG in the State is quite low in both absolute and relative terms."[3] This indicates that, while the total installed capacity of rooftop solar in New Hampshire has grown dramatically, creating education, installation, and maintenance jobs across the state, there remains substantial space for continued job growth.

In comparison to fossil fuel-fired generation, distributed generation like rooftop solar keeps more jobs in-state. Distributed generation resources are generally installed incrementally over many years, and require large supplies of local human resources. In contrast, fossil fuel facilities like a coal or gas-fired power plant are installed very infrequently and after a short, finite period of temporary construction jobs, very few jobs remain in-state. What does remain in-state is the burden of continuously paying for imported fuels not found in New Hampshire. This creates an indefinite cash-outflow situation for the state's economy, in contrast to distributed generation which is relatively labor intensive and has no associated fuel costs.

In addition, facilitating private investment in distributed generation is saving New Hampshire electric customers money. In 2016, behind-the-meter solar alone saved New England customers approximately $60 million. Distributed solar, also called behind-the-meter solar because it is installed behind the residential or business customer's electric meter and intended principally to generate electricity for on-site usage, brings down the region's electrical usage at times of highest demand. This means that the costliest (and often dirtiest) generating units are not called on during times of peak summer demand, saving all New England customers money. In addition, by reducing regional load, distributed solar defers or eliminates the need for costly new generation investments that would raise market costs for the region. Solar of all kinds contributes to energy diversity, but distributed solar is well-suited to serve localized resiliency purposes and to avoid local distribution costs, particularly when combined with energy storage. And the more energy we produce and use locally, the less we pay for transmission required to deliver electricity from distant power plants. In all of these ways, private investment in distributed generation brings economic stimulus for the state.

According to the U.S. Energy Information Agency (EIA), of New Hampshire's 2015 net electricity generation, 17% came from a range of renewable energy resources, including solar, wind, and biomass.[4] But as more clean energy comes online in the state, both in the form of large, centralized and small, distributed generating facilities, New Hampshire can become a powerhouse of clean energy and clean energy jobs.

As New Hampshire works to maintain and enhance its attractive status to high-tech companies, supporting clean energy investments is a necessity. According to Bloomberg New

[3] https://puc.nh.gov/Regulatory/Docketbk/2016/16-576/ORDERS/16-576_2017-06-23_ORDER_26029.PDF
[4] https://www.eia.gov/state/?sid=NH

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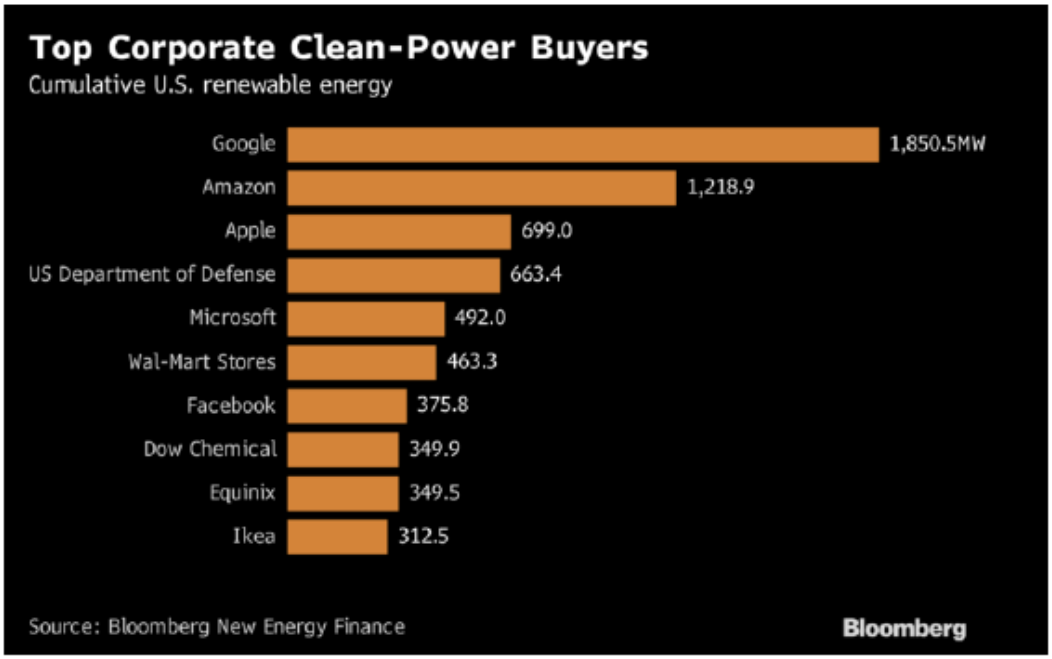
Energy Finance, corporations have agreed to buy 1.9 GW of clean power in the U.S. this year, and are on pace to match the 2.6 GW signed last year.[5] High-tech corporations are among the top purchasers of clean energy.[6]



The direct and indirect benefits brought by both distributed and centralized clean energy are substantial and growing. New Hampshire can capitalize on these benefits for significant job and revenue growth during the coming years. In order to accomplish this goal, we should strengthen the Renewable Portfolio Standard and support continued reasonable compensation for behind-the-meter solar.

Recognize That Energy Efficiency Is Economic Efficiency

Energy efficiency is a frugal, common sense energy measure. Energy efficiency is widely considered the lowest-hanging fruit to reduce energy costs for consumers, including both families and businesses. In order to fulfill the governor's objective of lowering bills and costs

[5] https://www.bloomberg.com/news/articles/2017-10-19/bezos-christens-wind-farm-as-u-s-companies-buy-more-clean-power
[6] Id.

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for New Hampshire electric customers, the state must invest in sensible and cost-effective energy efficiency measures and policies. And when we save money through cheap, cost-reducing energy efficiency, New Hampshire's families and business can use that money for other necessities and economy-stimulating investments.[7]

Energy efficiency is the cheapest among all energy resources, and it is a key tool used to constrain prices in regional electricity markets. It is also one of few tools that the State of New Hampshire controls to reduce New Hampshire's share of regional electricity grid costs.

Energy efficiency reduces loads on the New England grid, saving money region-wide. ISO-NE's 2017 Capacity, Energy, Loads, and Transmission ("CELT") report projects that aggressive regional deployment of behind-the-meter renewables and energy efficiency projects will result in peak load reductions on the order of hundreds of megawatts.[8] For example, the 2017 CELT projects a net peak load of 26,298 MW in summer 2020, while the 2016 CELT had forecast a net peak load of 26,789 MW, a difference of 491 MW. Energy efficiency is a major driver keeping demand for electricity essentially flat in New England, which means that we don't have to build new generation or transmission lines to accommodate a growing hunger for electricity, saving us money on costly investments that ISO-NE would otherwise require us to pay for.

The chart below depicts the significant extent to which energy efficiency, together with behind-the-meter solar, impact regional load forecasts, lowering regional capacity requirements and thereby reducing prices in the capacity markets—and ultimately reducing bills for consumers. This chart appeared in a recent presentation by the Department of Environmental Services reporting on the benefits and costs of using RGGI funds on energy efficiency programming.[9]

[7] We attach a joint op-ed written by the NH utilities, CLF, and other stakeholders who participated in the recent energy efficiency proceeding, about the many agreed-upon benefits of energy efficiency. The op-ed was published in the Concord Monitor on October 15, 2016, and is available online at http://www.concordmonitor.com/Energy-Efficiency-Standard-Provides-Opportunity-for-New-Hampshire-5390672.

[8] https://www.iso-ne.com/static-assets/documents/2017/05/2017_celt_report.xls

[9] Presentation of the NH Department of Environmental Services, "Reducing Carbon Dioxide from Power Plants: Benefits and Costs of the Regional Greenhouse Gas Initiative", Sept. 12, 2017, at 30 (attached).

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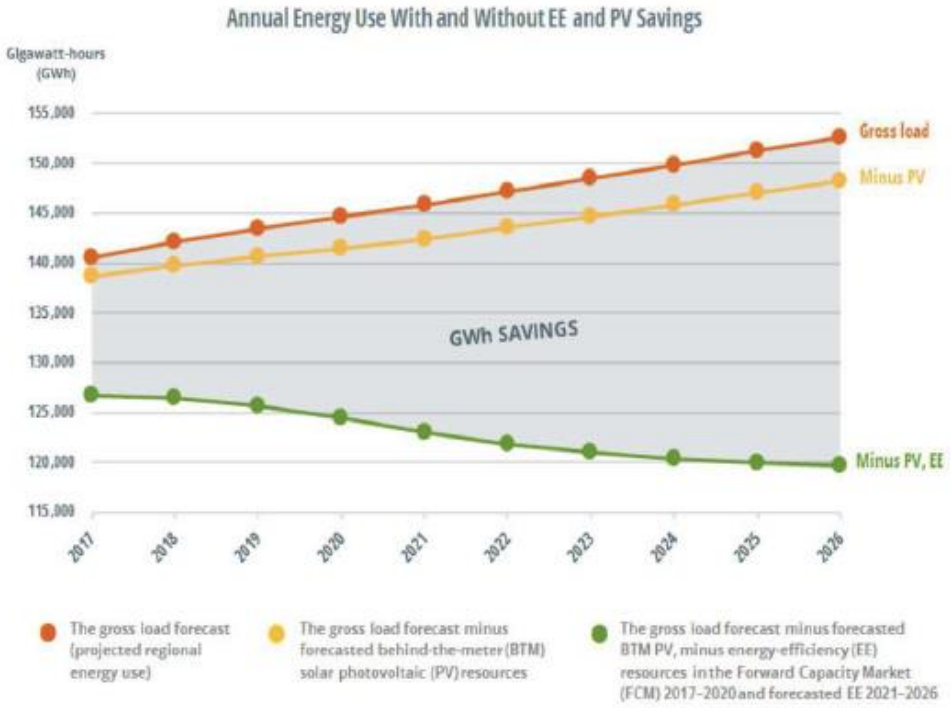

Not only does energy efficiency save New Hampshire money by saving the entire region money, if New Hampshire does not invest in energy efficiency, our state's portion of the region's grid costs will rise. ISO-NE allocates grid costs to states on a load-ratio basis, that is, according to a state's percentage of overall regional demand for electricity. As other states in the region continue to ramp up policies that reduce their share of regional load – including through energy efficiency, behind-the-meter solar, and energy storage – New Hampshire's share of the region's load will rise. If New Hampshire does not keep pace by supporting load-reducing measures including energy efficiency, it will be left bearing a disproportionate burden for regional grid costs. As grid costs are high in New England, and can represent a significant portion of the monthly bill, this would place an undue and unnecessary burden on New Hampshire families and businesses. With small up-front investments in energy efficiency, New Hampshire will lower its costs—and keep them from rising.

Energy efficiency also makes sense because it supports local jobs. Each year, across New Hampshire, we spend more than $6 billion on energy. A large percentage of those dollars immediately leaves the state's economy to pay for out-of-state fossil fuels. Energy efficiency

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helps us recapture some of those dollars. While energy efficiency is substantially cheaper than other energy resources, it supports many more local jobs than energy resources like fossil fuel-fired generation. When we maintain a thriving and stable local energy efficiency economy, we provide good jobs for New Hampshire's younger generation.

An important aspect of energy efficiency is that it supports a better quality of life for New Hampshire's low to moderate income families, and increases property values. By allocating a substantial portion of the state's energy efficiency funds to programs that benefit lower-income residents—as currently planned energy efficiency programs do—we increase quality of life, productivity, and well-being among these populations, ensuring that no one is left behind. We also increase the value of properties by improving the quality of homes in disadvantaged communities.

The 2018 to 2020 energy efficiency programs proposed by the New Hampshire utilities in Public Utilities Commission Docket No. DE 17-136 will result in customer energy cost savings of more than $867 million. These savings are roughly 4.7 times the cost of the programs, which is an excellent return on investment for electric customers. These programs will support 1,233 jobs, and avoid more than 2.8 million tons of greenhouse gas emissions and other pollutants. In addition, they will improve quality of life, property values, and human welfare throughout the state, including among populations most at need. Beyond the utility-run programs, other energy efficiency measures including the adoption of modern building codes support additional jobs and further improve human welfare, economic productivity, and property values.

Over the next 5 to 10 years, the state should make increasingly significant investments in energy efficiency and strengthen energy efficiency policies including building codes. By re-investing RGGI monies to fund energy efficiency programming, we can maximize the value of those dollars for New Hampshire.[10] New Hampshire currently lags behind other states in the region on energy efficiency, and cannot afford to neglect this area of energy investment.[11] The returns are too great to forego. Without these modest investments, the state leaves low-risk investment value on the table and weakens the New Hampshire economy.

TARGET PEAK ENERGY REDUCTIONS FOR LOWER ENERGY BILLS

Targeting peak energy is a matter of smart economic policy. New Hampshire needs to begin strategic peak energy reductions in order to rapidly and meaningfully lower electric bills. Demand for electricity typically spikes during a limited number of hours a year, and those hours constitute "peak demand." On average, 10% of electric system capacity is built to meet demand

[10] For more details on the value RGGI offers the NH economy, please see the attached Fact Sheet by Acadia Center on the impacts of RGGI in New Hampshire.
[11] More information on how New Hampshire compares to other states in the area of energy efficiency can be found in ACEEE's 2017 State Energy Efficiency Scorecard, available at http://aceee.org/research-report/u1710.

in just 1% of hours during the year. This drives up costs for New Hampshire electric customers, whether they are businesses or families.

Peak demand policies or programs can significantly lower costs for customers, strengthen electric services reliability, and reduce the costs of achieving environmental goals. Navigant carried out a study on the value of peak demand policies to Illinois and Massachusetts in 2015. Navigant's analysis showed that at a minimum, every dollar spent on reducing peak demand can save consumers at least $2 to $3.[12] These benefits can be higher, however, in some cases exceeding a $4 return on a $1 investment.[13] The benefit-cost ratio tends to increase as peak load is reduced by measures such as energy efficiency, demand response, or the deployment of behind-the-meter generation and storage resources.[14]

Peak demand reductions are particularly effective at reducing capacity costs, transmission costs, and emissions. By eliminating or lowering the highest levels of demand (peak demand), we avoid calling on the least efficient, most costly, and dirtiest generating units in the region. The two main avenues to reduce wholesale capacity charges in this way are to shift capacity cost allocations and to reduce the total electric generating capacity required on a region-wide basis to ensure that we can meet demand, known as ISO-NE's installed capacity requirement (ICR).[15] Transmission costs can also be reduced by lowering the highest levels of demand. Similar to capacity, there are two main ways to reduce transmission charges: directly reducing electric load (such as through energy efficiency or demand response) and non-transmission alternatives (NTAs), which can include distributed energy or energy storage.[16] Peak demand reduction also can reduce energy prices for hours with high price spikes by reducing generating costs.[17]

OSI and the Public Utilities Commission should facilitate the development and deployment of peak demand reduction strategies as soon as is feasible.

Reduce Reliance on Fuels that Harm Health and Diminish the State Economy

Economic inefficiencies and the need to build a clean energy future for New Hampshire require that we no longer prop up coal-fired electric generation and that we avoid the trap of expanded, unnecessary reliance on natural gas. As discussed below, it is essential that New Hampshire embrace a market-based approach that awards efficiency and does not put electric ratepayers at risk for investments made by public utilities. In addition to protecting New

[12] Navigant, "Peak Demand Reduction Strategy" (2015), available at https://info.aee.net/hubfs/PDF/aee-peak-demand-reduction-strategy.pdf?t=1509398833303 at 5-6.
[13] Id.
[14] Id.
[15] Navigant, "Peak Demand Reduction Strategy" (2015), at 7, available at https://info.aee.net/hubfs/PDF/aee-peak-demand-reduction-strategy.pdf?t=1509398833303
[16] See id.
[17] Id.

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Hampshire ratepayers, proceeding on this path will advance cleaner, more efficient energy sources that benefit the public's health and reduce greenhouse gas emissions.

A. Ensure Aging Fossil-Fired Power Plants are Subject to Competition

Eversource's aging fossil-fired power plants – Merrimack, Schiller and Newington Stations – are a significant reason why Eversource's energy services rate is higher than that of other electric utilities.[18] These aging plants are less efficient than other sources of electricity and therefore not as competitive in the market place. As a result, the plants do not generate electricity much of the time. In addition to being uncompetitive, these plants are a significant source of greenhouse gas emissions and other pollution.[19]

Eversource is the last remaining electric utility in New Hampshire to continue to own and operate electric generating facilities. As a result, Eversource has been in a position to rely on default energy services ratepayers to cover the cost of owning and operating its aging, inefficient power plant fleet. Fortunately, however, following activity in the Legislature and before the Public Utilities Commission enabling Eversource to proceed with the sale of its generating assets, Eversource's fossil-fueled power plants, as well as its fleet of hydroelectric facilities, were recently the subject of a PUC-supervised auction.[20] Should the PUC approve the auction results and Eversource's sale of its generating fleet (to two different purchasers – one for the fossil-fired plants, another for the hydroelectric plants), Eversource will finally exit the electric generating business and – at long last completing the electricity market restructuring required by RSA 374-F – will serve only electricity transmission and distribution functions.

With the completion of restructuring, the generation of electricity in New Hampshire will be within the sole province of competitive energy suppliers. Accordingly, Eversource's existing power generating facilities will no longer be supported by ratepayers and thereby buffered from private market forces. New Hampshire's Ten Year Energy Strategy should support this final implementation of restructuring, protecting ratepayers from the risks inherent in the ownership and operation of electricity generation by public utilities, and favoring market competition to

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[18] *See*, e.g., https://www.puc.nh.gov/ceps/shop.aspx (comparing current residential energy rates of Eversource ($0.11660 per KWh) with the rates of Liberty Utilities ($0.08644 per KWh), the NH Electric Co-op ($0.07466 per KWh) and Unitil ($0.07886 per KWh)); https://www.puc.nh.gov/ceps/ResidentialCompare.aspx?choice=Eversource (comparing Eversource's residential energy services rate of $0.11660 per KWh (July 2017 through Dec. 2017) to the numerous lower rates of competitive energy suppliers)

[19] On January 12, 2017, EPA New England released its 2015 toxics release inventory data for New Hampshire, showing that of the 137 facilities reporting, Merrimack Station was the facility that reported the largest quantity of on- and off-site environmental releases. *See* https://www.epa.gov/newsreleases/epa-analysis-shows-decreased-toxic-chemical-releases-new-hampshire-2015. Schiller Station reported the second highest quantity of releases, and Newington Station reported the ninth highest. *Id.*

[20] *See*, e.g., N.H. PUC Docket No. DE 17-124 at http://www.puc.state.nh.us/Consumer/Eversource_auction.html.

"reduc[e] costs to consumers while maintaining safe and reliable electric service with minimum adverse impacts on the environment." RSA 374-F:1.

B. Avoid the Natural Gas Trap

As inefficient coal-fired power plants and facilities like the Vermont Yankee nuclear power plant retire across New England, certain interests have clamored to suggest that New England is on the verge of an energy supply crisis, and that the construction of new and expanded natural gas pipelines is the only solution. As described below, these claims are false. Far from serving as a temporary "bridge fuel" to a fossil-free future, major investments in new and expanded pipelines will extend the use of fossil fuels, put ratepayers at risk of more stranded costs and higher bills, and undermine the state's ability to reduce greenhouse gas emissions consistent with the New Hampshire Climate Action Plan.

In the first instance, it is critical to note that the regional grid currently has significant surplus capacity, and price signals in the most recent capacity auctions have been at or near the auction floors. Additionally, ISO-NE set a target of 34,075 MW capacity in its most recent Forward Capacity Auction, FCA-11, but actually procured 35,835 MW in the auction—a surplus of 1,760 MW.[21] That surplus is expected to increase by an additional 395 MW in the next capacity auction (FCA-12, in February 2018) as a result of a recent change by ISO-NE to its internal method for forecasting the output of distributed, behind-the-meter solar generation.[22] And on top of that, ISO-NE's 2017 Capacity, Energy, Loads, and Transmission ("CELT") report projects that aggressive deployment of behind-the-meter renewables and energy efficiency projects will result in peak load reductions on the order of hundreds of megawatts.[23] For example, the 2017 CELT projects a net peak load of 26,298 MW in summer 2020, while the 2016 CELT had forecast a net peak load of 26,789 MW, a difference of 491 MW.

Despite the foregoing, certain natural gas and utility interests have proposed the need for more natural gas pipelines, and that such pipelines must be built at the risk of electric utility ratepayers. In particular, Algonquin Gas Transmission, LLC and Eversource have proposed a model in which Public Service Company of New Hampshire d/b/a Eversource – an electric utility – would acquire natural gas capacity, at the potential expense of its ratepayers, to help finance the so-called Access Northeast natural gas infrastructure expansion. In a 2016 decision, the PUC reviewed and correctly dismissed the proposed scheme as violating New Hampshire's electricity market restructuring act, RSA Chapter 374-F. Eversource's and Algonquin's appeal

[21] ISO-NE, "Forward Capacity Auction #11 Results Summary", available at https://www.iso-ne.com/static-assets/documents/2017/03/ccp_2020_21_fca_11_cso_flow_diagram.pdf.
[22] Maria Scibelli, ISO-NE, "Proposed Installed Capacity Requirement (ICR) Values for the 2021-22 Forward Capacity Auction (FCA # 12)" at 10 (Sept. 19, 2017), available at https://www.iso-ne.com/static-assets/documents/2017/09/a7_icr_and_tie_benefits_for_fca12.zip.
[23] https://www.iso-ne.com/static-assets/documents/2017/05/2017_celt_report.xls.

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of that decision is currently pending before the New Hampshire Supreme Court. Whatever the outcome,[24] New Hampshire policy should strongly disfavor the financing of natural gas pipeline infrastructure at the risk of ratepayers and strongly *support* the continued separation of electricity generation (including the acquisition of natural gas pipeline capacity) from electricity transmission and distribution, as required by RSA Chapter 374-F.

CLF strongly contests the premise that any public financing is necessary to provide a particular type of fuel to a certain segment of New England's merchant generation fleet. ISO-NE has already taken successful steps to adequately incentivize merchant generators to acquire sufficient fuel to serve system needs during the winter with its interim Winter Reliability Program, and will soon implement a long-term solution with the Pay for Performance standard. Analysis commissioned by CLF demonstrates more than adequate supply of natural gas through existing pipelines and liquefied natural gas imports.[25] The fallacy of a natural gas "crisis" in New England has been debunked repeatedly, including in a February 2017 study from Synapse Energy Economics that shows a declining need for natural gas in New England over the next fifteen years,[26] as well as in a report by Analysis Group published in November 2015,[27] and more recently in a report published in March 2017 and updated in May 2017 by the University of New Hampshire's Carsey School of Public Policy. That report reached four key findings:[28]

(1) that "New England does not need to increase energy use to continue to grow its economy";
(2) that "[w]hile the price per kilowatt hour of electricity in New Hampshire has been higher than the national average for decades, the average residential electricity bill is equal to the national average and the average commercial electricity bill is lower than the national average";

[24] The Massachusetts Supreme Judicial Court considered whether such a proposal is legal under Massachusetts' restructuring law and concluded that it is not, noting in part that doing so "would reexpose ratepayers to the very types of risks that the Legislature sought to protect them from when it enacted the restructuring act." *ENGIE Gas & LNG LLC v. Dep't of Public Utilities*, 56 N.E. 3d 740, 754 (Mass. 2016).
[25] Greg Lander, "Solving New England's Gas Deliverability Problem Using LNG Storage and Market Incentives" 16-17 (2015), available at http://www.clf.org/wp-content/uploads/2016/03/Solving-New-Englands-Gas-Deliverability-Problem.pdf.
[26] Synapse Energy Economics, Inc., "New England's Shrinking Need for Natural Gas" 17 (February 7, 2017), available at http://www.synapse-energy.com/sites/default/files/New-Englands-Shrinking-Need-for-Natural-Gas-16-109.pdf.
[27] Analysis Group, Power System Reliability in New England: Meeting Electric Resource Needs in an Era of Growing Dependence on Natural Gas (Nov. 2015), available at http://www.mass.gov/ago/docs/energy-utilities/reros-study-final.pdf.
[28] See Cameron Wake, et al., "New Hampshire's Electricity Future: Cost, Reliability, and Risk", Univ. of New Hampshire, Carsey School of Public Policy at 1, attached to these comments and available at http://scholars.unh.edu/cgi/viewcontent.cgi?article=1296&context=carsey (emphases added).

(3) that "New England's electrical grid has proven itself reliable during periods of high energy demand associated with cold winter temperatures, including the extreme polar vortex event of January 2014"; and
(4) that "[d]uring this period of rapid transformation in the global and regional energy markets, *there is significant stranded cost risk to electricity ratepayers for large infrastructure investments with uncertain return on investment.* ***This includes publicly-funded expenditures for new natural gas capacity.***"

In sum, subsidization of natural gas generation is not necessary and would be strongly at odds with both the fundamental principles of market competition and the protection of ratepayers from economic risk, as embodied in New Hampshire's restructuring law, RSA Chapter 374-F. It would also conflict with New Hampshire's objective of reducing costly and harmful greenhouse gas emissions.

INVEST IN ELECTRIC

Electricity is a resource that New Hampshire already exports in large volumes.[29] As Next Era Energy and other energy companies make major investments in New Hampshire-based solar farms and distributed solar generation investment ramps up across the state, New Hampshire stands ready to produce much more clean energy. Recognizing that clean energy is a local economic driver, the state can further capitalize off that resource by making significant investments in the transition to electric vehicles. The expanded use of heat pumps will also drive economic savings and public health benefits.

A. Electric Vehicles

The state must take decisive steps to prepare for electrification of the transportation sector. Electric vehicles are a clean and sensible choice for New Hampshire. Drivers of electric vehicles benefit from lower fueling and maintenance costs, without the economic volatility and foreign policy dependencies associated with foreign oil and gas. Local economies benefit from fewer dollars spent on imported fuel. And everyone benefits from increased energy independence and better air quality, as electric vehicles have few to no tailpipe emissions that harm public health.[30] Moreover, electric vehicles can provide valuable services, such as serving

[29] https://www.eia.gov/state/?sid=NH#tabs-1
[30] *See* B. Holmes-Gen & W. Barrett, American Lung Association, "Clean Air Future: Health and Climate Benefits of Zero Emissions Vehicles" (2016), available at http://www.lung.org/localcontent/california/documents/2016zeroemissions.pdf.

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as energy storage devices for the electric grid, with the potential to reduce electricity costs for all customers.[31]

Strategic investments in electric vehicles and associated infrastructure over the next 10 years will help keep tourism dollars flowing into and across New Hampshire, position New Hampshire as a strong competitor for high-tech jobs, and also keep energy dollars in-state rather than sending them abroad.[32] Transportation fueling currently represents approximately 33% of energy consumption in the state.[33] Vehicle technology is rapidly advancing, and manufacturers are already transitioning away from production of gasoline-fueled vehicles in response to global trends and growing consumer demand for clean, affordable electric vehicles.[34] Electrification of this major sector will enable more energy dollars to be spent on clean, local electric energy rather than foreign oil and gas resources. Additionally, electrification of the transportation sector is necessary to meet the state's climate goals[35] and maintain healthy air quality for New Hampshire residents.

As other New England states make major investments in electric vehicles and infrastructure, New Hampshire cannot afford to be left behind. Unlike other states in the region, New Hampshire currently has no electric vehicle incentives, utility initiatives, or fleet electrification programs to prepare New Hampshire to ride the coming electric vehicle wave.[36] There have been limited investments in strategic charging infrastructure, and certain localities and businesses have developed their own incentives including free charging of electric vehicles and priority reserved parking spaces; but now it is time for the State to take a leadership role. New Hampshire should lead by example by committing to electric vehicles for future fleet procurements and providing charging infrastructure for use by the public and state employees at major state offices. Additionally, recognizing the many public benefits of electric vehicles, the

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[31] *See generally* D. Lowell, B. Jones, & D. Seamonds, "Plug-in Electric Vehicle Cost-Benefit Analysis: Massachusetts" (2016), available at http://mjbradley.com/sites/default/files/MA_PEV_CB_Analysis_FINAL_17nov16.pdf.

[32] *See* Energy Information Agency, "Gasoline and Diesel Fuel Update", www.eia.gov/petroleum/gasdiesel/ (stating that 68 percent of the cost of gasoline is for crude oil and refining, plus a portion of federal taxes, leaving only about 20 percent of the cost for local economies in the form of local taxes, distribution costs, and marketing costs).

[33] Energy Information Agency, "New Hampshire State Profile and Energy Estimates", available at https://www.eia.gov/state/?sid=NH (estimating that in 2015, energy consumption in the transportation sector constituted 32.7% of all energy consumption in the state).

[34] *See, e.g.*, Keith Bradsher, "China Hastens the World Toward an Electric Car Future", N.Y. Times (Oct. 9, 2017), available at https://www.nytimes.com/2017/10/09/business/china-hastens-the-world-toward-an-electric-car-future.html?_r=0; Bill Vlasic & Neal E. Boudette, "G.M and Ford Lay Out Plans to Expand Electric Models", N.Y. Times (Oct. 2, 2017), available at https://www.nytimes.com/2017/10/02/business/general-motors-electric-cars.html.

[35] *See* E.A. Stanton et al., "The RGGI Opportunity 2.0: RGGI as the Electric Sector Compliance Tool to Achieve 2030 State Climate Targets" iii (2016) ("The least-cost strategies modeled . . . to achieve an all-sector 40 percent emission reductions in the RGGI region by 2030 include converting one-third of gasoline-powered light-duty vehicles to electric vehicles . . . .").

[36] *See* National Research Council, "Overcoming Barriers to Deployment of Plug-In Electric Vehicles" (2015), available at http://www.nap.edu/catalog/21725/overcoming-barriers-to-deployment-of-plug-in-electric-vehicles.

state should establish programs to incentivize the purchase of vehicles and charging infrastructure. The New Hampshire Public Utilities Commission should also initiate a proceeding to explore the role of the state's electric distribution companies in preparing for and promoting vehicle electrification.[37]

The $30,914,841.09 available to the State of New Hampshire through the Volkswagen Settlement offers a significant opportunity to jump-start New Hampshire's transition to a clean, electrified transportation future. New Hampshire should invest the maximum funds allowable (15%, or approximately $4.6 million) in electric vehicle charging infrastructure.[38] The remainder of the funds should be invested in new electric transit vehicles, such as electric buses, and/or repowering old transit vehicles to run on electricity. This investment will reap long-term benefits. Electric buses cost less over their lifetime than conventional bus technologies once fuel and maintenance costs are factored in. Electric buses also offer significant public health, environmental, and climate benefits. These savings are passed on to taxpayers, who reinvest in their local economy.[39] For more details on CLF's recommendations regarding the use of the Volkswagen Settlement funds, please see comments filed by CLF with the Department of Environmental services on February 10, 2017, enclosed herewith.

B. Heat Pump Technologies

In order to lower costs for New Hampshire consumers and improve public health and safety, New Hampshire's electrification strategy should not stop at electric vehicles. It should also include market transformation for thermal and water heating purposes. According to the EIA, nearly half of all New Hampshire households relied on fuel oil for heat in 2015, and another 14% depended on propane.[40] As every Granite Stater with a tank in their basement or yard knows, these are very expensive fuels that sap our economy and contribute to poor health outcomes. Energy efficient heat pump technologies can provide an economic and safe substitute for these costly fuels. And again, with stable long-term pricing for clean energy supplies, price impacts associated with fuel volatility can be reduced and even eliminated, particularly as the cost of energy storage drops.

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[37] *See generally* Citizens Utility Board, "The ABCs of EVs: A Guide for Policy Makers and Consumer Advocates" (2017), available at https://citizensutilityboard.org/wp-content/uploads/2017/04/2017_The-ABCs-of-EVs-Report.pdf.

[38] *See* Partial Consent Decree, *In re* Volkswagen "Clean Diesel" Marketing, Sales Practices, and Products Liability Litigation, MDL No. 2672 CRB (JSC) (N.D. Cal. Sept. 30, 2016) (Dkt. No. 1973-1), https://tinyurl.com/y7scscpf, App. D-2, ¶ 9.

[39] *See* Lauren Aragon & Matthew Casale, "U.S. PIRG Ed. Fund, From Deceit to Transformation: How States Can Leverage Volkswagen Settlement Funds to Accelerate Progress to a Clean Transportation System" 27 (2017), https://tinyurl.com/ybacws2w.

[40] https://www.eia.gov/state/?sid=NH

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PRIORITIZE ACTION ON CLIMATE CHANGE, INCLUDING SETTING FIRM GREENHOUSE GAS REDUCTION GOALS

In order to keep our families healthy and safe, our businesses thriving, and our state proud and beautiful, addressing climate change with speed and efficiency needs to be a common objective.

The New Hampshire Climate Action Plan, which was developed with significant stakeholder input, establishes a goal of reducing greenhouse gas emissions by 80% below 1990 levels by 2050. As the plan makes clear, this goal is based on the reductions that climate scientists believe to be necessary to stabilize greenhouse gases in the atmosphere at or below 450 parts per million CO_2.[41] It is projected that stabilizing concentrations of greenhouse gases at this level will avoid the most severe and catastrophic potential impacts of climate change.[42] We must uphold the emissions reduction goals of the Climate Action Plan.

There is no doubt that climate change is affecting the United States and affecting New Hampshire. New Hampshire has a diverse economy but one of its greatest assets is its outdoor resources including its winter snow. The latest evidence shows that the length of the average winter in the United States has shortened by one month compared to 100 years ago.[43] The first freeze has typically gotten later in New Hampshire, and winters are on average both shorter and milder than in the past. Since 1970, average annual temperatures in New Hampshire have risen 2.6 degrees Fahrenheit, with average winter temperatures rising 4.5 degrees.[44] Droughts and extreme weather events have also gotten more common.[45] Climatic shifts such as these not only affect tourism and the ski industry in New Hampshire, they affect everything from corn farming to tree farming to maple syrup production.[46]

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[41] New Hampshire Climate Action Plan, Executive Summary at 1, available at https://www.des.nh.gov/organization/divisions/air/tsb/tps/climate/action_plan/documents/nhcap_xsum.pdf.

[42] Id. (citing IPCC (2007). Summary for Policymakers. In: Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Pachauri, R.K and Reisinger, A. (eds.)] IPCC, Geneva, Switzerland, 1-22. http://www.ipcc.ch/pdf/assessmentreport/ar4/syr/ar4_syr_spm.pdf.).

[43] https://www.theguardian.com/us-news/2017/oct/28/us-winter-has-shrunk-by-more-than-one-month-in-100-years?CMP=share_btn_tw

[44] See video by the NH Department of Environmental Services on climate impacts in New Hampshire (Apr. 5, 2016), available here: https://www.youtube.com/watch?v=ktcVNlLclIQ

[45] Id.

[46] *See*, e.g., http://nhpr.org/post/how-could-climate-change-affect-new-hampshires-maple-syrup-industry#stream/0; http://nhpr.org/post/nh-ski-industry-must-cope-warmer-seasons-and-midwinter-thaw#stream/0; http://nhpr.org/post/nh-house-passes-2-million-funding-dairy-farmer-drought-relief#stream/0. Certain potential impacts of climate change on New Hampshire are outlined by the U.S. EPA at the following link: https://19january2017snapshot.epa.gov/sites/production/files/2016-09/documents/climate-change-nh.pdf/

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According to the end-of-year 2016 Commissioner's Column in the newsletter of the NH Department of Environmental Services:[47]

> Climate change is real, serious and primarily caused by human actions. This fact is supported by the overwhelming majority – 99.9% – of the world's climate scientists, based on a review of over 24,000 peer-reviewed articles on global warming. New Hampshire residents are already experiencing its effects as our environment changes: more intense rainstorms that wash out roads and culverts, and damage homes, businesses and wastewater and drinking water facilities; and gradual warming that supports larger tick populations that infect people and wildlife with disease, and that negatively affects our cold weather industries, such as skiing, snowmobiling, logging and maple-syrup production.

And according to New Hampshire's scientists, our iconic loon and moose have begun to suffer serious impacts as a result of climatic shifts.[48] Like the Old Man of the Mountain, New Hampshire's loon, moose, maple syrup, and snowy mountains define us. As each erodes and disappears, so does our way of life and economy.

To address the threat of climate change, the state must establish firm and mandatory emissions reductions goals in line with the Climate Action Plan. Without transparent, mandatory emissions reductions goals, the state's efforts on climate change will be ad hoc and thus relatively inefficient. In comparison, under a mandatory scheme New Hampshire could holistically review its climate strategies to more effectively identify efficient, rapid, and cost-effective means to transition to clean energy resources and diminish climate-warming emissions while strengthening the state's economy and supporting good, stable job opportunities.

In addition to setting firm emissions reductions goals in line with the Climate Action Plan, New Hampshire should join the U.S. Climate Alliance. The U.S. Climate Alliance is a group of states that have committed to achieving emissions reductions goals in line with the Paris Climate Accord. New Hampshire and Maine are the only New England states that have not yet joined the U.S. Climate Alliance. Joining the Alliance can help leverage the investments and wherewithal of New Hampshire and other Alliance members. New Hampshire need not work alone – smart, coordinated state action can ensure that we effectively address the human, economic, and environmental threats posed by climate change.

The potential leverage and impact of this coalition of states is significant. U.S. Climate Alliance members represent more than 36% of the population of the United States, and at least $7 trillion in GDP.[49] Collectively, Alliance members are home to approximately 1.3 million

[47] Commissioner's Column, Newsletter of the NH Department of Environmental Services at 1-2 (Nov.-Dec. 2016), available at https://www.des.nh.gov/organization/commissioner/pip/newsletters/en/documents/2016-nov-dec.pdf
[48] http://nhpr.org/post/climate-change-leading-cause-moose-and-loon-population-decline-new-hampshire#stream/0
[49] https://www.usclimatealliance.org/

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clean energy jobs.[50] Together, we can more effectively continue the effort to create a high-tech, clean energy economy that demonstrates international leadership.

In addition to setting mandatory emissions goals and allying with other states to more effectively transform the energy economy, New Hampshire should strengthen the Renewable Portfolio Standard. We should also continue to strengthen RGGI while utilizing the state's RGGI funds for strategic energy efficiency and clean energy investments that will lower customer bills while supporting the local clean energy economy. Both the RPS and RGGI are key, readily available tools to further the clean energy economy.

Finally, the state should support, recognize, and leverage efforts by New Hampshire cities, towns, and other localities to transition to a clean energy economy and reduce harmful emissions. In particular, the state should support cities and towns calling for research into offshore wind, as well as those that are committing to the Paris Accord emissions reductions goals, or to a long-term transition to 100% clean energy. The cities of Concord, Nashua, Portsmouth, Keene, and Lebanon have all committed to achieving the Paris Accord goals.[51] These cities should be recognized as climate investment leaders, and partners for the state, as we seek to avert the worst impacts of climate change in New Hampshire.

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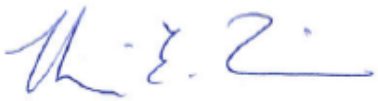
Thank you for the opportunity to submit comments. Should your office decide to move forward with revisions to the energy strategy, we urge the adoption of a transparent and inclusive process that incorporates advance input from a diverse and strategic range of stakeholders, as well as the solicitation of public comments on any draft revisions. We look forward to a continued dialogue on the state's energy future.

Respectfully submitted,



Melissa E. Birchard

[50] https://www.usclimatealliance.org/
[51] http://nhpr.org/post/concord-fifth-nh-city-commit-paris-climate-goals#stream/0

Opinion > Columns (/Opinion/Columns/)

My Turn: Energy efficiency standard a boon for state

By MELISSA BIRCHARD
For the Monitor

Saturday, October 15, 2016

One of New Hampshire's economic engines is getting a boost with the start of a new Energy Efficiency Resource Standard. Utilities, state agencies, businesses and advocates all came together this year to develop a new energy efficiency framework that strengthens our state's commitment to reducing energy costs and helps keep New Hampshire's energy dollars from leaving the state economy.

Each year, across New Hampshire, we spend more than $6 billion on energy. A large percentage of those dollars immediately leaves the state's economy to pay for petroleum and other out-of-state fuels. Energy efficiency helps us recapture some of those dollars. This makes energy bills more manageable and frees up savings that can be used by New Hampshire's families and businesses for other necessities and investments.

The new energy efficiency standard establishes specific targets for energy savings that utilities must meet. By 2020, New Hampshire will realize cumulative energy savings equal to 3.1 percent of 2014 electric sales and 2.25 percent of 2014 natural gas sales.

Those savings will build upon the utilities' award-winning "NHSaves" programs that help customers reduce energy by using new technologies and improving buildings. The new energy efficiency framework makes programs more available to lower-income families and also makes a wide range of incentives available to help families, businesses, municipalities and nonprofits take advantage of cost-saving energy efficiency projects.

While those who choose to participate directly in energy efficiency programs will benefit immediately from lower energy bills, those who don't choose to become active participants will also benefit. There will be less wear-and-tear on the energy grid, less need to build new power plants, and less need to rely on the higher-cost power plants that keep the system running on hot summer days and chilly winter nights.

Energy efficiency is what we often refer to as the "lowest cost resource." It costs much less to reduce the amount of energy we use through more efficient products and buildings than it does to produce, transmit and distribute energy.

Beyond achieving cost-effective savings, energy efficiency provides many other benefits to our communities. The contractors who perform building improvements and equipment installations are usually local businesses employing skilled New Hampshire workers. Improving the efficiency of our buildings also improves air quality and comfort, giving us safer, healthier and more enjoyable spaces to live, play, and work.

The savings and value of energy efficiency are real and quantifiable. The programs are required to be cost-effective under stringent tests. The Public Utilities Commission, independent evaluators and ISO-New England measure and verify the savings these programs offer us on an annual basis. ISO-New England, as the independent nonprofit that oversees New England's electricity grid, not only quantifies energy efficiency results, it counts on those reductions in its regional planning. When we cut costs region-wide through reliable and low-cost efficiency measures, we make sure that New Hampshire energy bills are more manageable as a direct result of energy efficiency.

The new energy efficiency standard provides New Hampshire families, businesses, towns and nonprofits an opportunity to reduce their utility bills, achieve long-term savings that result in system-wide cost-reductions, improve the comfort and safety of our buildings and increase economic activity in the state.

Thousands of residents and businesses across the state can tell you about the savings they have already seen from past energy efficiency projects. However, there is more demand for energy efficiency than current programs can meet. These programs are very popular and as a result they frequently become oversubscribed. This causes projects to be delayed and leaves additional savings on the table.

With the implementation of an energy efficiency standard, Conservation Law Foundation and the groups listed below look forward to working together with families, businesses, legislators and other leaders to complete more efficiency projects and achieve greater energy savings that will benefit all of us here in New Hampshire.

To help spread the word about the benefits that improved energy efficiency offers all of us in New Hampshire, the following parties to the recent energy efficiency settlement agreement have all jointly come together to draft and publish this oped: Eversource Energy; Unitil Energy Systems; Liberty Utilities Corp.; New Hampshire Electric Cooperative; New Hampshire Legal Assistance for The Way Home; Belknap-Merrimack Community Action Agency; Southern New Hampshire Services; Conservation Law Foundation; The Jordan Institute; NH Sustainable Energy Association; Acadia Center; TRC Energy Services; Representative Robert Backus, pro se; New Hampshire Office of Energy and Planning; New Hampshire Department of Environmental Services; and the Office of the Consumer Advocate.

Collectively, these diverse parties urge support for the lowest-cost energy resource that exists – energy efficiency.

(Melissa Birchard is an attorney for Conservation Law Foundation-New Hampshire in Concord.)

Reducing Carbon Dioxide from Power Plants Benefits & Costs of the Regional Greenhouse Gas Initiative

SB 125 Committee Meeting

September 12, 2017

Michael Fitzgerald, Assistant Director & Joe Fontaine, Tech. Programs Manager
Air Resources Division
Michael.Fitzgerald@des.nh.gov, 271-6390
joseph.fontaine@des.nh.gov, 271-6794

Presentation Outline

- How does the current RGGI program work? - a Market-based approach
- Environmental & Economic Benefits
- 2016 Program Review Recommendation for post-2020
- Projected bill impacts

2

Regardless, Better to be in RGGI than Out

- If NH drops out of RGGI, ratepayers will continue to see all costs associated with RGGI reflected in the regional wholesale price of electricity
  - NH would not receive auction revenues
  - Ratepayers would not receive rebates
  - No energy efficiency investments

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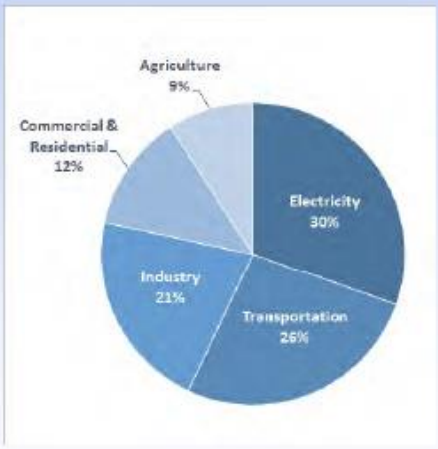
3

Greenhouse Gases
2014 U.S. Emissions by Sector



NOTE: As EVs & heat pumps penetrate the market, transportation & heating emissions will shift to the electricity sector

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4

NH's 2009 Climate Action Plan for Reducing Greenhouse Gas (GHG) Emissions

- Developed by 29 diverse members over a year, engaged >125 stakeholders & received input from >200 citizens
- Aim: achieve the greatest feasible GHG reductions & the greatest possible long-term economic benefits to citizens
- The Task Force recommended that NH strive to achieve long-term GHG reductions of 80% by 2050
  - Implement RGGI

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5

What Are the Benefits of a Cap and Trade Approach?

- Certainty that a specific **regional** level of emissions will be achieved and maintained over time (even with economic growth)
- More regulatory certainty, more compliance flexibility, and lower administrative requirements and costs
- Drives down compliance costs, making further reductions more cost effective
- Complements other Clean Air Act provisions (e.g., NAAQS) to help protect local air quality

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The Acid Rain Experience

- EPA Acid Rain Program = Title IV of the Clean Air Act Amendments of 1990
  - Bipartisan during Pres. George H. W. Bush admin
- If no cap-and-trade program, national SO_2 emissions would have increased by 20% (higher demand) from 1990 to 2000-2002
  - Emissions at all plants are lower than they otherwise would have been
  - Higher emitters reduced first
- Actual emissions decreased by 32%

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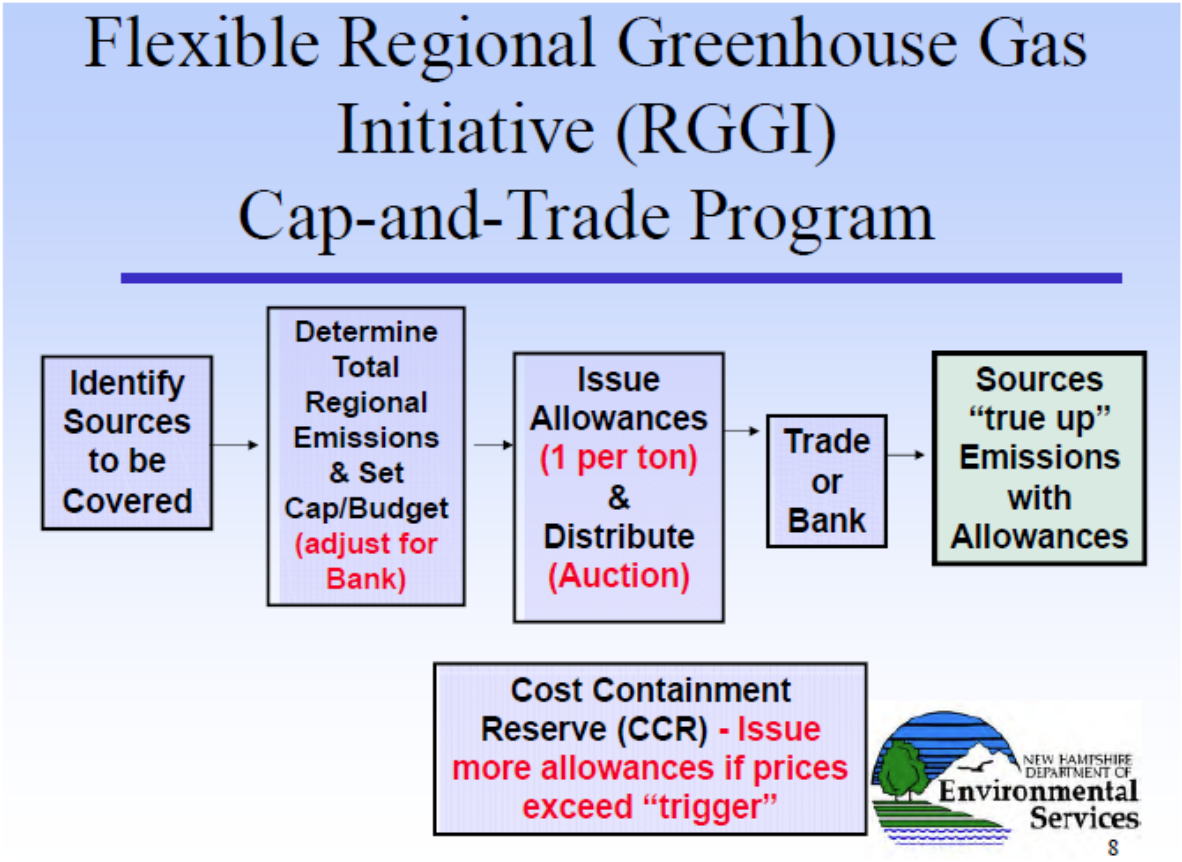
7


Flexible Regional Greenhouse Gas Initiative (RGGI) Cap-and-Trade Program
Identify Sources to be Covered
Determine Total Regional Emissions & Set Cap/Budget (adjust for Bank)
Issue Allowances (1 per ton) & Distribute (Auction)
Trade or Bank
Sources "true up" Emissions with Allowances
Cost Containment Reserve (CCR) - Issue more allowances if prices exceed "trigger"
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8

Benefits – RGGI Emissions Reductions

- NH has kept pace with RGGI region; both successfully achieved reductions
  - Under RGGI, states have already reduced power sector carbon emissions almost 50%
  - NH achieved a 55.7% reduction
    - NH's 2009 budget was 8,620,460 tons
    - NH's 2015 CO_2 emissions = 3,818,378 tons

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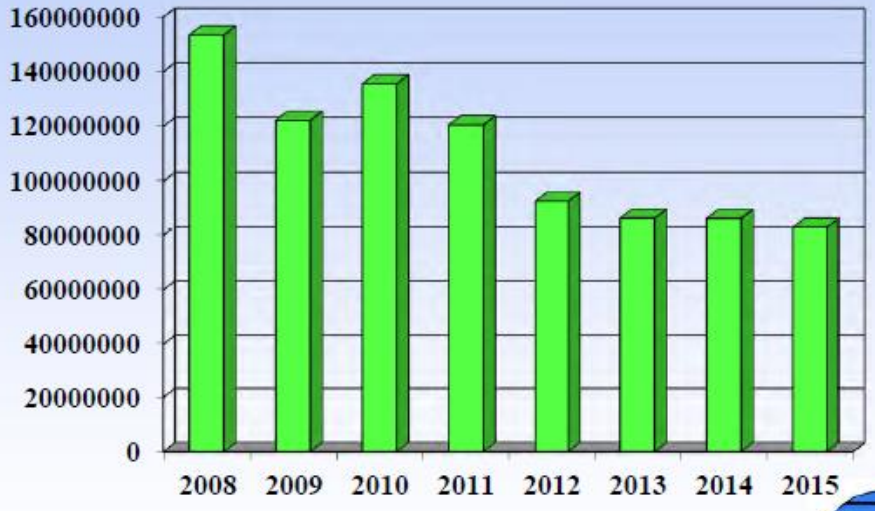
9

CO_2 Emissions (tons) from Applicable Sources

Regional Trends



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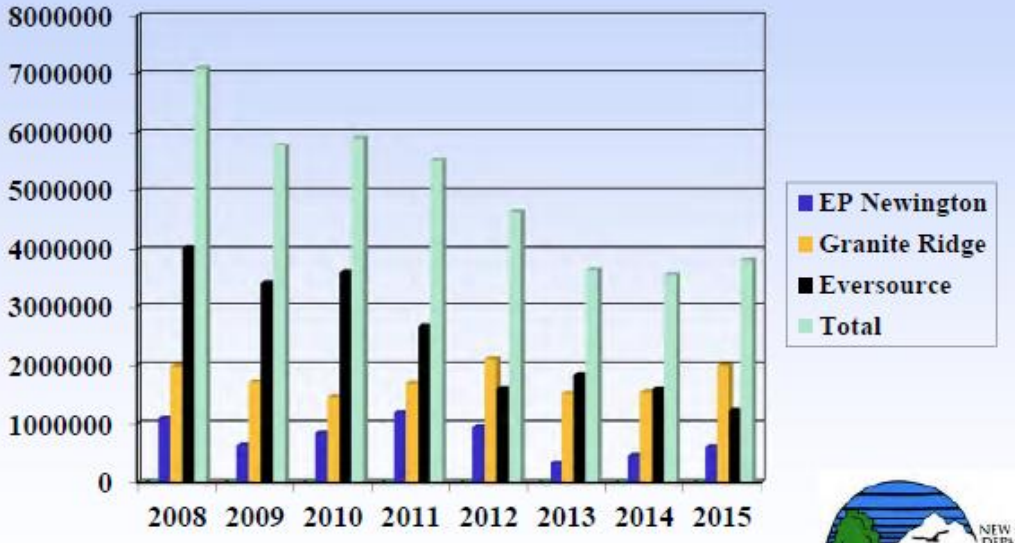
10

CO_2 Emissions (tons) from New Hampshire Sources



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11

How were emissions reduced?

- Increased energy efficiency (see nhsaves.com), due in part to investment of RGGI funds
- Increased generation from non-emitting sources: Solar, Wind, Hydro, and Nuclear
- Fuel switching from oil and coal to natural gas due to:
  - relatively lower natural gas prices
  - RGGI cap

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12

Regional Economic Benefits of RGGI Investments

http://rggi.org/docs/ProceedsReport/RGGI_Proceeds_Report_2014.pdf

Category	Cumulative (2008 - 2014)	Lifetime
Participating Households	4.6 million	N/A
Participating Businesses	21,400	N/A
Workers Trained	7,200	N/A
Short Tons CO_2 Avoided	1.7 million	15.4 million
Equiv. Cars Off Road	319,000	2.9 million
Megawatt-Hours Saved	2.4 million	20.6 million
MMBtu Saved	5.3 million	76.1 million
Energy Bill Savings	$618.1 million	$4.67 billion

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13

Regional Economic Benefits of RGGI Investments

"The Economic Impacts of the Regional Greenhouse Gas Initiative on Nine Northeastern and Mid-Atlantic States." Analysis Group. July 2015

"The Economic Impact of the Regional Greenhouse Gas Initiative on Ten Northeast and Mid-Atlantic States." Analysis Group. November 2011

- Independent reports from the Analysis Group have found that RGGI is creating jobs and generating significant economic benefits.
  - A 2015 report found that RGGI's second three-year period is creating $1.3 billion in net overall economic benefit for the region, and generating benefits in every state.
  - This is in addition to $1.6 billion that is being generated from RGGI's first three years.

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14

NH Benefits

Maintain tourism by:

- **Reducing impacts of sea level rise**
- **Reducing impacts on Fall foliage**
- **Reducing impacts on ski industry**
- **Reducing impacts on maple sugaring**
- **Reducing impacts on forest industry**
- **Reducing impacts on fishing**

15

Insurance Industry Estimated Benefits/Avoided Costs

- U.S. DOE Estimated Avoided Social Cost = $35/metric ton
- During the 30 year period from 1972 to 2001, the state experienced 17 events, while during the next 14 years, between 2002 and 2015, the state experienced 29 events.
- U.S. Property & casualty insurers experienced an estimated $44 billion in losses in 2011 from more frequent & severe natural disasters
- "From our industry's perspective, the footprints of climate change are around us and the trend of increasing damage to property and threat to lives is clear," - Franklin Nutter, president of the Reinsurance Assoc. of America
- *"Hurricane Harvey Starkly Exposes the Financial Burden of Climate Change on Economy, Environment and Human Health"*

http://www.csrwire.com/press_releases/40321-Hurricane-Harvey-Starkly-Exposes-the-Financial-Burden-of-Climate-Change-on-Economy-Environment-and-Human-Health

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16

Insurance Industry Estimated Benefits/Avoided Costs

- **Swiss Reinsurance Company Ltd. - weather-related insurance industry loss in the U.S. rose from about $3 billion/year in the 1980s to about $20 billion annually by the end of the past decade.**
- **"A warming climate will only add to this trend of increasing losses, which is why action is needed now," - Mark Way, Swiss Re's**
- ***"Big Insurance Companies Are Warning The U.S. To Prepare For Climate Change"***

https://thinkprogress.org/big-insurance-companies-are-warning-the-u-s-to-prepare-for-climate-change-eb3fdf22d674/

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17

NH Co-Benefits

- **Cut tons of harmful particle pollution, sulfur dioxide and nitrogen oxides as a co-benefit reducing future health care costs**
  - **The Health Impact of RGGI**
    http://abtassociates.com/RGGI.aspx
    - ***From 2009 – 2014, reductions in harmful pollutants have saved NH $66 - $148 million in health costs from avoided asthma cases, heart attacks, infant & adult mortality, fewer hospital visits, & lost workdays***

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18

Estimated Benefits of federal Clean Power Plan

- Each year, avoid an estimated:
  - 3,600 premature deaths
  - 1,700 heart attacks
  - 90,000 asthma attacks
  - 300,000 missed workdays & schooldays
- Lead to net health & climate benefits worth an estimated $26 billion to $45 billion in 2030

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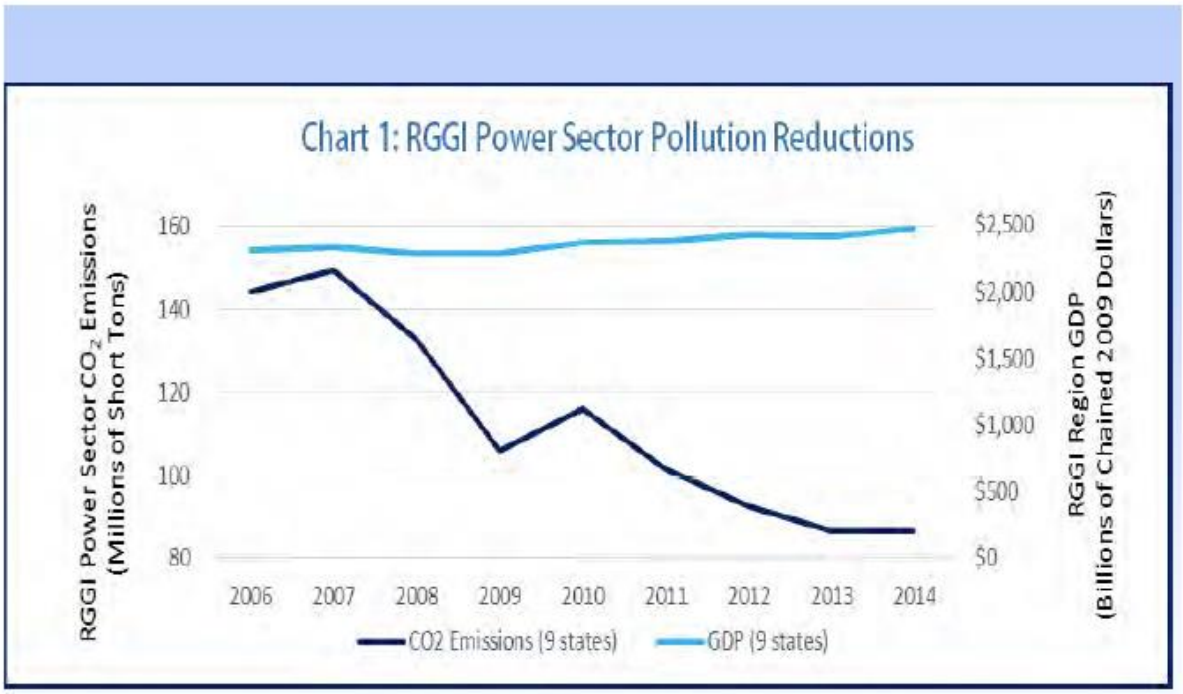
19



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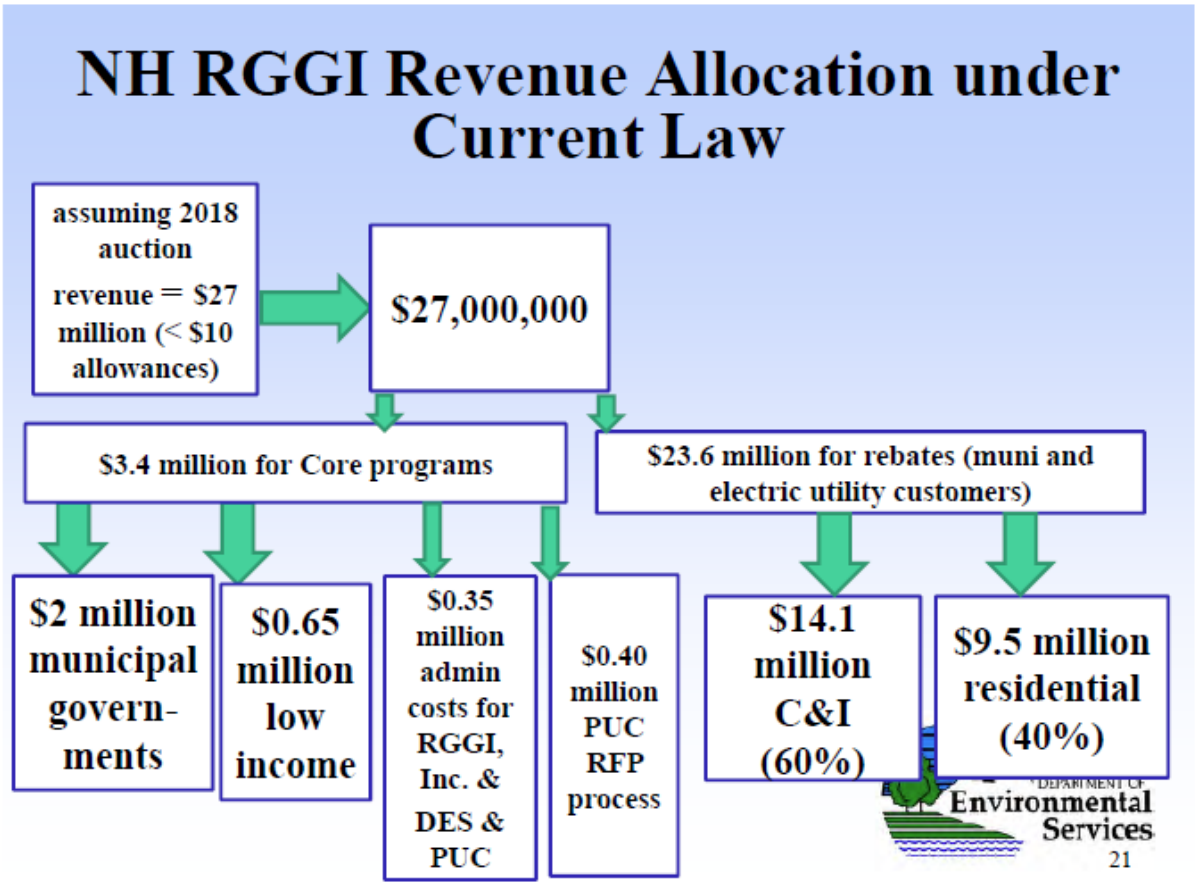
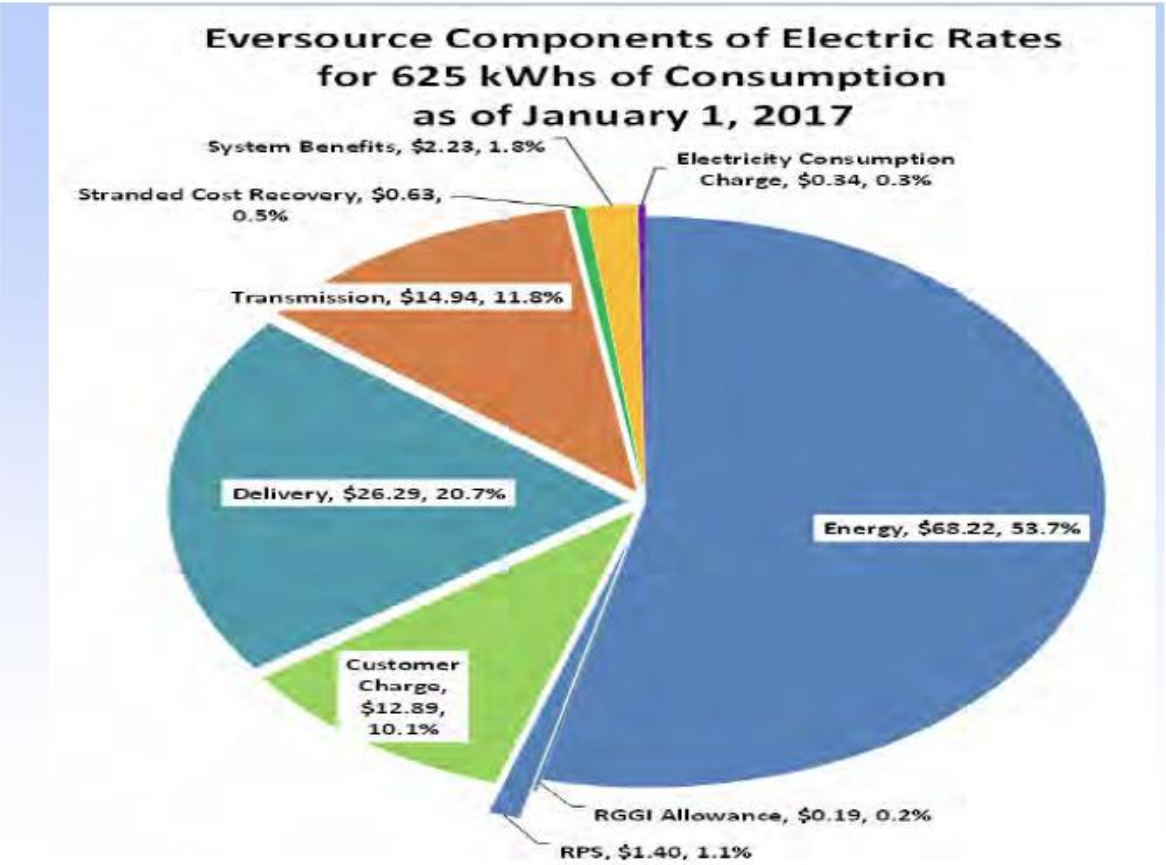
20


NH RGGI Revenue Allocation under Current Law
assuming 2018 auction revenue = $27 million (< $10 allowances)
$27,000,000
$3.4 million for Core programs
$23.6 million for rebates (muni and electric utility customers)
$2 million municipal govern-ments
$0.65 million low income
$0.35 million admin costs for RGGI, Inc. & DES & PUC
$0.40 million PUC RFP process
$14.1 million C&I (60%)
$9.5 million residential (40%)
Environmental Services
21


Eversource Components of Electric Rates for 625 kWhs of Consumption as of January 1, 2017
System Benefits, $2.23, 1.8%
Electricity Consumption Charge, $0.34, 0.3%
Stranded Cost Recovery, $0.63, 0.5%
Transmission, $14.94, 11.8%
Delivery, $26.29, 20.7%
Energy, $68.22, 53.7%
Customer Charge, $12.89, 10.1%
RGGI Allowance, $0.19, 0.2%
RPS, $1.40, 1.1%

RGGI 2016 Program Review Recommendation for post-2020

- Maintains similar glide-path
  - 2.5% of 2014 cap
  - Annual cap reduction = 2,275,000 tons regionally
  - No changes before 2021
  - 7 states do more in 2021; NH & ME do no added reductions and no ECR

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23

2021 Cap Stepdown

- **Current 2020 regional cap (78.2 million) minus annual decline (2.275 million) = 75.9 million**
- **Additional 825,215 reduction proposed for 2021 to accommodate NY's request for a 30% reduction 2020-2030**
- **NH (5.22% (unchanged) or 43 thousand) & ME (3.6% or 29 thousand) excluded**

  (29.1% 10-year reduction)
- **Proposed 2021 regional cap =**
  - **75,147,784; overall 30% reduction**

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24

Emissions Containment Reserve (ECR)

- Increases emissions reductions, if costs are less than projected, by withholding allowances from auctions if prices fall below triggers
- Functions as a counterpart to the Cost Containment Reserve (CCR) which has been in effect since 2014.
- Proposed size = 10% of annual state budgets of states participating in ECR
- Trigger price = $6.00 in 2021, and rises at 7% per year
- 7 Participating states will demonstrate performance
- NH & ME can re-consider at next program review
- Supported by stakeholders & experts

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25

2016 Program Review Bills Impact Analysis

- All afore-mentioned benefits are excluded
- Only includes costs to ratepayers
- Even so, NH bills still will slightly decrease under new proposal

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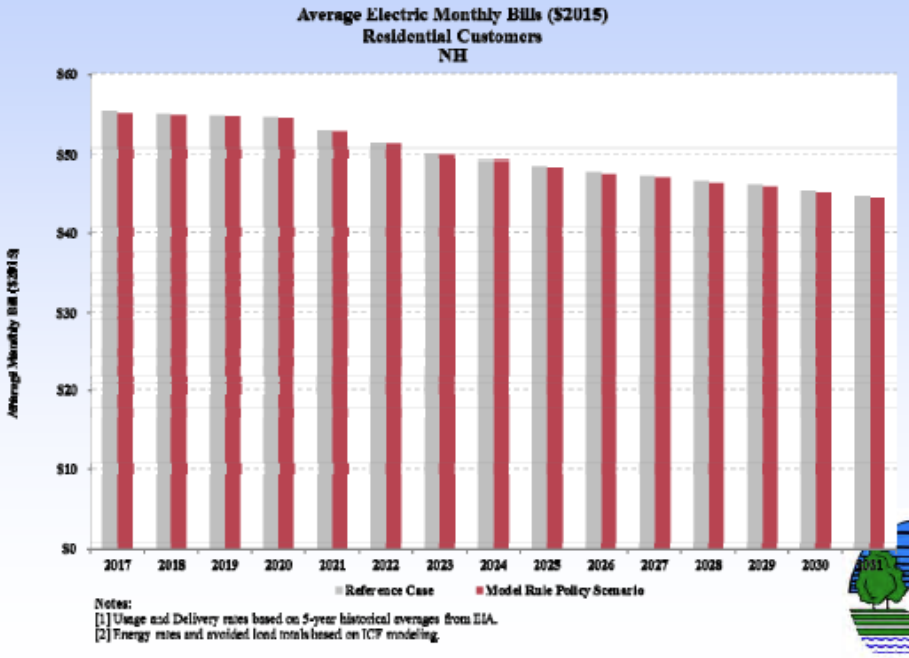
26

Bills Impact Analysis



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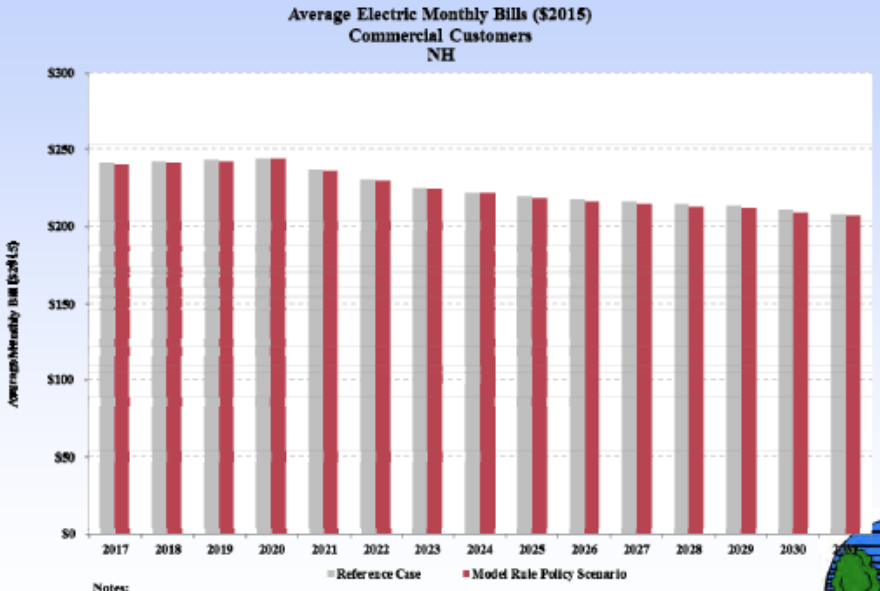
27

Bills Impact Analysis



Notes:
[1] Usage and Delivery rates based on 5-year historical averages from EIA.
[2] Energy rates and avoided load totals based on ICF modeling.

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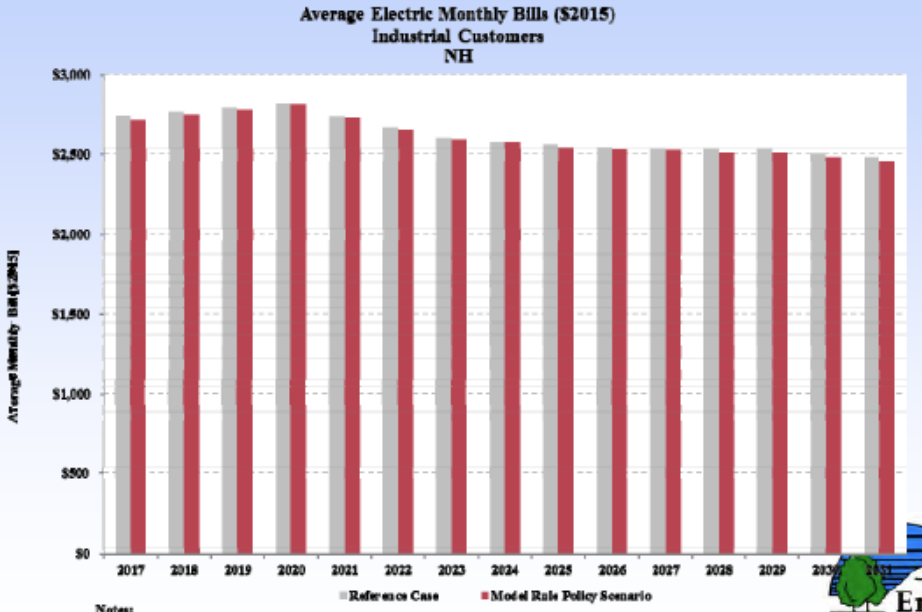
28

Bills Impact Analysis



Notes:
[1] Usage and Delivery rates based on 5-year historical averages from EIA.
[2] Energy rates and avoided load totals based on ICF modeling.

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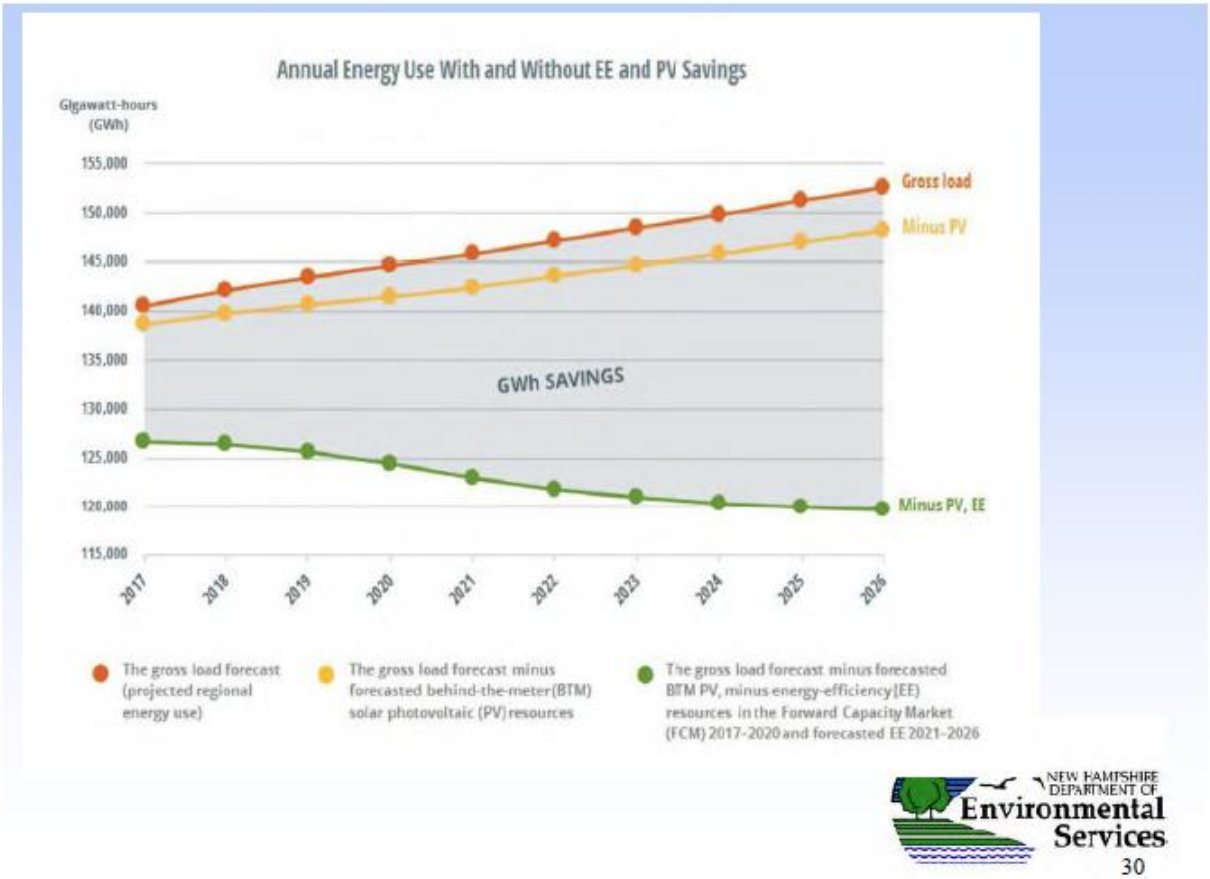
29



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30

More info on RGGI Proposal

- 9/25 stakeholder webinar http://rggi.org/docs/ProgramReview/2017/09-25-17/Meeting_Notification_09_25_17.pdf

31

RGGI's Role in New Hampshire

Economic, Health and Energy Bill Impacts

February 2017

Acadia Center
Advancing the Clean Energy Future

Introduction

The Regional Greenhouse Gas Initiative (RGGI) has now been in effect for eight years in New Hampshire and the numbers tell a clear story: RGGI has produced substantial benefits—not just for the environment—but for the economy, the workforce, and public health.

RGGI Investments in New Hampshire

Independent analyses of RGGI's first two control periods (2009-2011 and 2012-2014, respectively) have shown the macroeconomic and employment benefits to New Hampshire from the state's investment of RGGI auction revenue.[i] As Table 1 shows, most of New Hampshire's RGGI revenue has been used to fund energy efficiency programs with additional funds used for ratepayer assistance.

Table 1: New Hampshire Investment of RGGI Auction Revenue, 2009-2014

Investment Period	Education and Job Training	Direct Bill Assistance	General Fund	Energy Efficiency	GHG Programs and Program Administration	Total
1st Control Period (2009-2011)	$1,181,506	-	$9,272,116	$21,483,151	$998,939	$32,935,712
2nd Control Period (2012-2014)	-	$18,520,278	-	$22,255,248	$839,613	$41,615,139
Total (through 2014)	$1,181,506	$18,520,278	$9,272,116	$43,738,399	$1,838,552	$74,550,851

RGGI has driven considerable economic growth in New Hampshire, largely as a result of reinvestment of program revenue. Table 2 describes RGGI's macroeconomic and employment impacts on the state.[i]

Table 2: RGGI's Impact on the New Hampshire Economy, 2009-2014

Investment Period	Value Added (Million Dollars)	Employment Created (Job-Years)
1st Control Period (2009-2011)	$17	458
2nd Control Period (2012-2014)	$67.3	583
Total (through 2014)	$84.3	1,041

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Health Impacts

Measures taken to reduce power sector CO_2 emissions also result in reduced emissions of harmful co-pollutants like SO_2, NOx, mercury, ozone and particulate matter ($P.M_{2.5}$). Emissions reductions attributable to RGGI have made New Hampshire's air cleaner, its residents healthier and its workforce more productive. **From 2009 to 2014, reductions in harmful pollutants have saved New Hampshire $66 to $148 million in health costs from avoided asthma cases, heart attacks, infant and adult mortality, fewer hospital visits and lost work days.**[ii]

Energy Efficiency

To-date, most of New Hampshire's RGGI revenue has been used to fund energy efficiency programs. In terms of cost savings, energy efficiency investments yield a uniquely high return in the energy sector: NHSaves electric efficiency programs deliver energy savings at 77% lower costs than the price of buying more power.[iii] Region-wide RGGI investments in energy efficiency through 2014 total $792 million, and those measures are expected to result in lifetime energy bill savings of $3.62 billion.[iv] New Hampshire's current use of RGGI auction revenue continues to provide benefits for the state, but the relatively small portion of funds directed towards energy efficiency prevents New Hampshire from maximizing the potential benefits of RGGI participation. Greater investment in the cost effective NHSaves programs will prevent New Hampshire from falling behind the rest of the participating states.

Electricity Rate Impacts

New Hampshire Department of Environmental Services (DES) and the Public Utility Commission (PUC) concluded that RGGI accounted for "less than five one hundredths of a percent of total default energy costs,"[v] and that is without accounting for RGGI-funded investments that would lower those costs. More broadly, average electricity rates have declined across the RGGI region by 3.4% from 2008 (the year before RGGI began) to 2015, while the rest of the country has experienced a 7.2% increase."[vi] While New Hampshire retail electricity rates have increased from 2008 to 2015, the average annual increase has been a modest 1.3%,[vii] less than the national inflation rate over that period.[viii] This data suggests that market factors other than RGGI are responsible for New Hampshire's slight increase in electricity rates.

As DES and PUC noted, RGGI repeal in New Hampshire would be unlikely to result in lower electric rates due to the dynamics of the regional energy market. RGGI's impact on the wholesale electricity price in New England is determined by the marginal (price-setting) power plants, which are primarily located in the southern New England states, and would be unaffected by New Hampshire RGGI repeal. The only significant impact of RGGI repeal would be a loss of approximately $20 million in annual funds for rebates and reinvestment in New Hampshire.

For more information:

Jordan Stutt, Policy Analyst, jstutt@acadiacenter.org, 617.742.0054 ext. 105
Ellen Hawes, Senior Analyst, ehawes@acadiacenter.org, 802.649.1140

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[i] *The Economic Impacts of the Regional Greenhouse Gas Initiative on Nine Northeast and Mid-Atlantic States*, Analysis Group, July 2015. http://www.analysisgroup.com/uploadedfiles/content/insights/publishing/analysis_group_rggi_report_july_2015.pdf and *The Economic Impacts of the Regional Greenhouse Gas Initiative on Ten Northeast and Mid-Atlantic States*, Analysis Group, November 2011.
[ii] *Analysis of the Public Health Impacts of the Regional Greenhouse Gas Initiative*, Abt Associates, January 2017. http://abtassociates.com/RGGI
[iii] *2017 New Hampshire Statewide Energy Efficiency Plan*, NHPUC Docket DE 14-216, December 2016.
[iv] *The Investment of RGGI Proceeds Through 2014*, RGGI, Inc., September 2016. https://www.rggi.org/docs/ProceedsReport/RGGI_Proceeds_Report_2014.pdf
[v] HB 592-FN-FISCAL NOTE, January 19, 2017. http://gencourt.state.nh.us/bill_status/billtext.aspx?id=514
[vi] *RGGI Status Report Part I: Measuring Success*, Acadia Center, July 2016. http://acadiacenter.org/document/measuring-rggi-success/

University of New Hampshire
Carsey School of Public Policy

CARSEY PERSPECTIVES

March 7, 2017 (updated May 10, 2017)

New Hampshire's Electricity Future

Cost, Reliability, and Risk

Cameron Wake, Matt Magnusson, Christine Foreman, and Fiona Wilson

May 2017 update

PointLogic Energy, a source for natural gas pipeline flow and capacity in the original report, has recently updated its models for calculating natural gas flow in the Tennessee Gas Pipeline in New England. This model update has resulted in significant changes to their previous estimates. Most importantly, data obtained from PointLogic Energy in December 2016 supported the finding that overall net gas flow in the "Tennessee Gas Pipeline: NY to MA" was from Massachusetts to New York from 2013–2016; their revised models indicate a net flow during the same period from New York to Massachusetts. To be conservative, we have removed analysis of natural gas pipeline flow and capacity from this report that relied on the original data obtained from PointLogic Energy. Instead, we use estimates of natural gas pipeline flow and capacity published in a 2014 ICF International report that was commissioned by ISO New England (Exhibit 2-3, pp. 12)[a] and information provided by the U.S. Energy Information Administration.[b]

[a] ICF International, "Assessment of New England's Natural Gas Pipeline Capacity to Satisfy Short and Near-Term Electric Generation Needs: Phase II," 2014 (see endnote 14).

[b] U.S. Energy Information Administration, "U.S. State-to-State Capacity," updated 12/31/2015; U.S. Energy Information Administration, "New England Natural Gas Pipeline Capacity Increases for the First Time Since 2010," December 6, 2016 (see endnote 15).

KEY FINDINGS

Economic Growth and Energy Use	New England does not need to increase energy use to continue to grow its economy. From 2005 to 2015, real state GDP in New England grew by 9.7 percent while energy use fell by 9.6 percent (Figure 1). Over the same time period real GDP for the entire U.S. grew by 15.2 percent, while energy use fell by 3.4 percent (Figure 2).
Cost	While the price per kilowatt hour of electricity in New Hampshire has been higher than the national average for decades, the average residential electricity bill is equal to the national average and the average commercial electricity bill is lower than the national average (Table 1). New England has adapted to higher electricity prices via improvements in energy efficiency and a transition to a less energy-intensive economy. The energy intensity of the New England economy is much lower than the national average (Figure 3).
Reliability	New England's electrical grid has proven itself reliable during periods of high energy demand associated with cold winter temperatures, including the extreme polar vortex event of January 2014.
Risk	During this period of rapid transformation in the global and regional energy markets, there is significant stranded cost risk to electricity ratepayers for large infrastructure investments with uncertain return on investment. This includes publicly-funded expenditures for new natural gas capacity.

Introduction

Over the past decade a number of factors have transformed global and national energy markets. Access to low-cost natural gas has been a significant part of this trend. Nationally, natural gas-fired power generation was expected to have exceeded coal-fired power generation for the first time in 2016,[1] and in New England about 50 percent of electricity is now generated from natural gas.[2] With natural gas now such a large part of New England's energy mix, there is a concern that the demand for heating and electricity during cold periods will cause spikes in wholesale electricity prices and that demand may be greater than the available pipeline capacity to deliver natural gas.[3] The region's utility industry has proposed the expansion of pipeline capacity to meet this seasonal increase in the demand for natural gas.

In light of the trends influencing energy markets, this perspectives brief and a related report[4] examine the cost of electrical power in New Hampshire and New England, the reliability of the electrical power system in terms of its ability to

About Carsey Perspectives

Our "Carsey Perspectives" series presents new, innovative ideas and ways of looking at issues affecting our society and the world.

meet demand, and the risk New Hampshire ratepayers might face from various proposals to secure or increase the supply of electricity. We find evidence that near-term levels of demand and supply pose no threat to grid reliability, that current pipeline capacity is adequate, and that better contracting practices and other "soft-infrastructure" changes combined with the promotion of energy efficiency and renewable energy will have at least as large a return on investment as expanded pipeline capacity, without exposing ratepayers to higher electricity rates stemming from expensive infrastructure investments.

Cost of Electrical Power in New Hampshire

In 2015, electricity accounted for approximately 25 percent ($1.7 billion) of all energy expenditures in New Hampshire,[5] and average retail electricity prices in the state, at 18.5 cents per kilowatt hour, were the eighth highest in the country and 47 percent higher than the U.S. average (Table 1). The latter is also the case for New England as a whole. But despite these higher rates, the average monthly New Hampshire residential electricity bill was $115, similar to the U.S. monthly average of $114.[6] New Hampshire residents pay 5.5 percent of their income for overall household energy-related expenses, similar to the overall U.S. resident portion of expenditures at 5.6 percent. In terms of commercial use, the average monthly New Hampshire electric utility bill in 2015 was actually lower than the U.S. average commercial bill, at $529 versus $671.[7]

TABLE 1. AVERAGE PRICE OF ELECTRICITY AND AVERAGE MONTHLY ELECTRIC BILL IN NH AND THE U.S. IN 2015 FOR THE RESIDENTIAL AND COMMERCIAL SECTORS

SECTOR	NH	US
Residential		
Price of Electricity (cents per KWH)	18.5¢	12.7¢
Electric Bill (dollars per month)	$115	$114
Commercial		
Price of Electricity (cents per KWH)	15.0¢	10.6¢
Electric Bill (dollars per month)	$529	$671

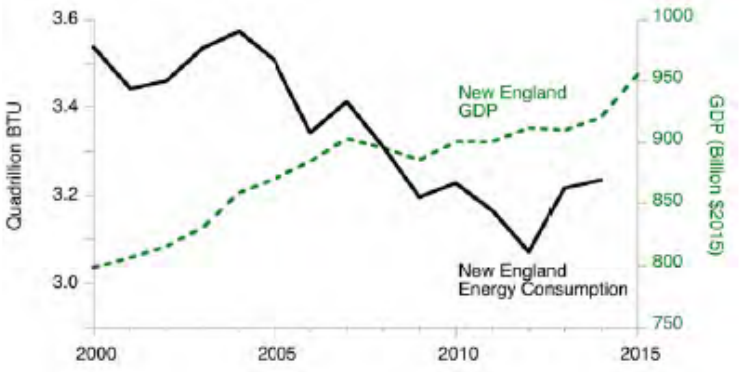
Source: U.S. Energy Information Administration

The relatively higher price of electricity in New Hampshire and New England is a result of several factors,[8] including higher transmission and distribution costs that have resulted from a large number of new transmission projects (over 600 across New England since 2002[9]), wholesale market rules, higher air quality standards, historical investment decisions (and the stranded costs associated with some of those investments), and the lack of indigenous fossil fuel sources that place the region at the "end of the pipeline" for the transport of fossil fuels.

New England has adapted to higher prices through energy efficiency and other energy management investments.[10] Even as the combined gross domestic product (GDP) for all six New England states increased by 9.7 percent from 2005 to 2015, overall energy use declined by 9.6 percent (Figure 1). During the same period, the U.S. GDP grew 15.2 percent while energy consumption fell 3.4 percent (Figure 2). Energy intensity (energy use divided by GDP) in New England is much lower than the U.S. average (Figure 3), demonstrating that New England consumes much less energy per dollar of GDP. In addition, over the past decade, New England's energy intensity has improved by 12.7 percent.

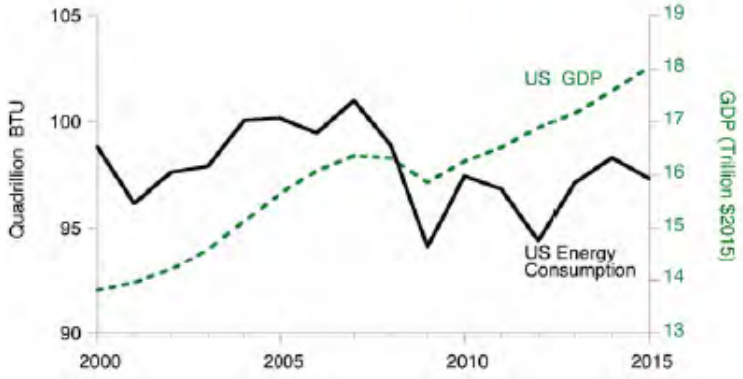
Though New Hampshire residents and businesses pay the same or less for energy as other areas of the country, it is important to prevent further increases in the cost of energy and ideally to reduce the

FIGURE 1. NEW ENGLAND ENERGY CONSUMPTION AND REAL STATE GDP FOR NEW ENGLAND, 2000–2015



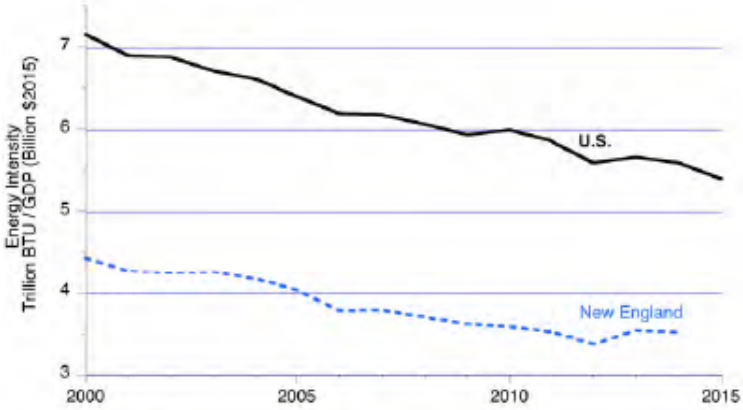
Source: U.S. Energy Information Administration and U.S. Department of Commerce - Bureau of Economic Analysis

FIGURE 2. U.S ENERGY CONSUMPTION AND REAL U.S. GDP, 2000–2015



Source: U.S. Energy Information Administration and U.S. Department of Commerce - Bureau of Economic Analysis

FIGURE 3. ENERGY INTENSITY FOR THE NEW ENGLAND STATES AND THE ENTIRE UNITED STATES FROM 2000–2015



Source: U.S. Energy Information Administration and U.S. Department of Commerce - Bureau of Economic Analysis

overall cost of electricity in New Hampshire. This is especially true for customer groups adversely affected by New Hampshire's relatively high electricity prices, including more intensive commercial and industrial users of electricity, as well as low-income households who pay a greater portion of their income for energy.

Reliability of the Electrical Supply

In New England, the share of electrical power generated from natural gas has grown from 15 percent in 2000 to almost 50 percent in 2015.[11] The region's electric utility industry has expressed concern that the demand for electricity during periods of cold winter weather will be greater than current pipeline capacity to deliver natural gas, resulting in unreasonably high electricity prices and possible power grid instability. ISO New England, the organization responsible for coordinating the region's power grid, has called for new natural gas infrastructure investment.[12]

Several studies conducted between 2012 and 2015 have examined the reliability of the New England power grid, and none of the eight reviewed for this study found that grid reliability is an immediate risk to New England's energy security.[13] Furthermore, while some studies have suggested that grid reliability may be an issue after 2021, the potential challenges are primarily associated with extreme operating conditions. The region's power grid system operator has demonstrated success in managing these extreme conditions and has been proactive in adapting the rules and procedures under which power generators operate to further increase grid reliability.

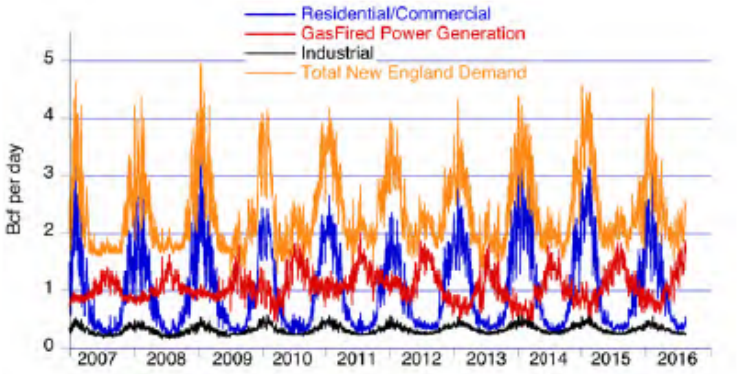
Several lines of evidence support the conclusion that few if any electrical grid reliability problems are likely to emerge before 2021. First, an ICF International report[14] estimates natural gas pipeline capacity in New England at 4.17 billion cubic feet per day (Bcf/d) (Table 2). This, combined with peak shaving capacity (1.45 Bcf/d) and direct LNG import capacity (0.72 Bcf/d), estimates an overall supply capacity of natural gas of 6.34 Bcf/d in winter. This capacity value exceeds recent New England peak winter demand (compare Table 2 values to the peak demand of under 5 Bcf/d illustrated in Figure 4). A separate indicator of pipeline capacity is the sum of state inflow capacities obtained

TABLE 2. ESTIMATES OF NEW ENGLAND NATURAL GAS SUPPLY CAPABILITIES

Natural Gas Source	Winter Supply Capability 2016–17 (Bcf/d)*
Pipeline Capacity	4.17
Peak Shaving Capacity	1.45
Direct LNG Import Capacity*	0.72
Total	6.34

Note: * LNG only includes Everett; it does not include LNG from Northeast Gateway or Neptune. **Source:** ICF International. Available online at https://www.iso-ne.com/static-assets/documents/2014/11/final_icf_phii_gas_study_report_with_appendices_112014.pdf.

FIGURE 4. DAILY NATURAL GAS CONSUMPTION BY SECTOR IN NEW ENGLAND FROM 2007–2016 IN BILLION CUBIC FEET PER DAY



Note: Wintertime consumption by the residential/commercial (blue line) and industrial (black line) sectors peaks in winter, while consumption by gas-fired power generators (red line) peaks in summer. **Source:** PointLogic Energy. Available online at https://pointlogicenergy.com/.

from the U.S. Energy Information Administration (U.S. EIA) for natural gas pipelines in New England of 4.96 Bcf/d.[15] This represents an estimate of the total pipeline capacity that exists in New England. However, some pipeline in-flow capacity may not be fully available due to technical capacity constraints within the New England natural gas system.[16] The difference between the state in-flow pipeline capacity and the estimates of pipeline capacity obtained from the ICF study[17] raises the possibility that pipeline capacity may be underutilized and/or that changes in New England internal gas pipeline infrastructure might allow for greater utilization of existing in-flow pipeline infrastructure.

Second, "soft infrastructure" changes (changes to rules, regulations, or policies such as the Winter Reliability Program) can serve as an effective tool for mitigating spikes in wholesale prices. For example, New England electric utilities that purchase gas to generate electricity typically do not contract for firm transportation services[18] to obtain natural gas; instead, they take what is left over. This is a major deliverability challenge and diminishes supply reliability. Specifically, power generators that rely on natural gas to generate electricity do not find it profitable to contract for access to gas under the current New England power system rules because firm gas transportation arrangements are structured as "take-or-pay" contracts.[19] Under these contracts, generators are required to pay for transportation capacity whether or not they are operating, and therefore contracts are not desirable. During most days of the year, generators are able to access gas and use transportation that would otherwise be surplus at far lower cost than contracting for firm transportation. While this contracting structure works for most of the year, during days of high demand it can result in periods when most of the gas is being used by sources who have gas contracts (including natural gas utilities supplying their residential customers and large industrial users). While such scarcity can result in price spikes for natural gas and electricity when demand increases rapidly due to very cold periods or when other major electricity generation stations (such as nuclear power plants) go off-line, they do not appear to impact system reliability. For example, during the high demand for natural gas and related price spikes that occurred in January 2014 associated with the outbreak of the Polar Vortex, not only did the ISO New England power grid provide sufficient electricity to New England consumers during this time period, ISO New England actually assisted the PJM (Mid-Atlantic) energy marketplace by dispatching additional generation units in New England.[20]

Third, electricity consumption in New England is expected to decline by 0.2 percent per year over the next decade.[21] Even with this projected decline, concerns have been raised about the supply impact of the 2014 retirement of the Vermont Yankee nuclear power plant and

the proposed retirement of Pilgrim Nuclear Power in Massachusetts in 2019, as well as the possible closure of several coal- and oil-fired generating plants.[22] Requests from companies to connect electric generation assets to the grid (interconnection requests) are, however, plentiful. Between 2016 and 2020, more than 11,000 megawatts of capacity (35 percent of total existing generating capacity of 31,000 megawatts[23]) have been proposed, and these don't even include plans for transmission lines to import hydroelectric energy from Canada, discussed below. Almost 60 percent of proposed generation is natural gas or dual fuel (natural gas and oil) and about 35 percent is wind, mostly in Maine. While not all projects will necessarily be constructed, the interconnection requests provide a useful indicator that there is a considerable amount of new electrical power production slated to come online in the near future. One report suggests that, from a reliability perspective, the current buildout plan—evidenced by the interconnection requests—is sufficient over the short term.[24]

Plans to build new transmission lines to import hydropower from Quebec into New England include the Northern Pass[25] project, designed to bring 1,090 megawatts through New Hampshire, and the 1,000 megawatt New England Clean Power Link[26] transmission line underneath Lake Champlain and into Vermont. This range of new supply could provide diversity in the source of energy used to power New England's grid, an important hedge in light of rapidly changing global energy markets. There has been insufficient study assessing the energy security risk of increasing New England's dependence on natural gas sourced primarily from one geographic region (Marcellus Shale from the Appalachian Basin). Yet, the natural gas export capacity from that region to other regions of the United States and globally is expanding significantly.[27]

Risks to the Grid and to Ratepayers

The difference between the sum of state in-flow capacity obtained from the U.S. EIA and the estimated available capacity assumed in the ICF study may be evidence of some of the potential risks associated with pipeline investments including that changes in supply and/or demand can result in underutilized pipeline. Demand can end up not matching supply when the pipelines are built, leaving stranded costs that the customer ends up having to pay. (Stranded costs are ones that must be paid by utility ratepayers if infrastructure investments become redundant either through market forces or regulation.) Given the long-term cost recovery period of infrastructure, a poorly informed decision can have a long-term impact on electricity rates.

Previous utility proposals have requested that New Hampshire electric ratepayers fund the costs associated with new natural gas pipelines. But the finding that near-term energy supply is not a threat to power grid stability[28] provides New Hampshire policy makers time (that is, years) to fully consider the costs, benefits, and risks associated with increasing New Hampshire's reliance on one fuel source from one geographic region.

Proceeding carefully and deliberately seems particularly important if the taxpayer (and not private capital) will be funding the new infrastructure.

Proceeding carefully and deliberately seems particularly important if the taxpayer (and not private capital) will be funding the new infrastructure. An example supporting a careful approach is the investment in 2012 of $409 million in new pollution control equipment at the Merrimack Station coal-fired power generation plant in Bow, New Hampshire. Due to changing market conditions, the plant is now valued at just $10 million. New Hampshire ratepayers are paying for all but $25 million of the $409 million through a cost recovery mechanism on electricity bills.[29] This single investment[30] will add 0.4 cents per kilowatt-hour (or about 2.5 to 3.0 percent) to every New Hampshire electric ratepayer's bill for many years to come. If new natural gas capacity results in overbuild, and ratepayers are contractually obligated for the costs, the cost of unneeded capacity will reduce the savings estimated to accrue to electric ratepayers.

Responses from an October 2016 Granite State Poll[31] show that a large swath of New Hampshire residents—58 percent—oppose using ratepayer funds for new pipeline infrastructure. This view was shared by almost half of self-described politically conservative respondents (48 percent) and six in ten liberals (63 percent) and moderates (60 percent).

Historically, New Hampshire has lagged behind the New England region in renewable energy and

energy efficiency investment. For example, in 2015 New Hampshire had both the lowest total ($26 million) and per capita ($19.20) public spending on electric efficiency programs out of the New England states. New Hampshire's per capita expenditure on energy efficiency programs was almost 80 percent less than that of Vermont.[32] However, New Hampshire has made progress in supporting clean energy investment with its participation in the Regional Greenhouse Gas Initiative (enacted in 2008), the Renewable Portfolio Standard (2007), and the recently approved Energy Efficiency Resource Standard (EERS) (August 2016). The New Hampshire EERS takes effect in January 2018 and has established a cumulative goal of 3.1 percent electric savings relative to 2014 kilowatt-hour sales. States that have implemented EERS have experienced three times the energy savings as states without an EERS.[33] This is an example of the type of policy that is expected to help New Hampshire cost effectively meet its energy needs without paying for large infrastructure projects and dealing with the associated stranded-costs risk.

The relative net benefits of pipeline expansion, LNG contracting, and energy efficiency and demand reduction for New England were analyzed in a 2015 Analysis Group report[34] that followed a transparent methodology and made assumptions based on the current state of the energy marketplace. Results showed all three scenarios having a significant positive return on investment for ratepayers (these returns do not include environmental benefits). The LNG contract scenario had the lowest annual cost ($18 million) and the highest anticipated return on investment (150 percent). The energy efficiency scenario had the highest annual cost ($101 million) but a return on investment (145 percent) similar to LNG. Pipeline expansion had an annual cost in between these two scenarios ($66 million), and a lower but still significant return on investment (92 percent). In terms of dollars, the energy efficiency scenario has the highest return on investment of $146 million versus $61 million for pipeline expansion and $27 million for LNG.

A measure of stranded-cost potential was developed by calculating the worst-case scenario for dollars at risk (a measure that indicates the magnitude of risk, not the likelihood). The LNG and energy efficiency scenarios have similar worst-case stranded-cost risk profiles, ranging between $90 million and $101 million. In contrast, the risk for the pipeline was about twenty times higher, at $1,980 million.

In response to a request from New Hampshire energy stakeholders for more New Hampshire-specific information, we developed a spreadsheet model to directly compare the net benefits of pipeline expansion versus expansion of energy efficiency and solar energy. The assumptions used to develop the model are detailed in Section 5 of the full report. The total estimated cost for the natural gas expansion scenario from 2017 to 2030 was $1.3 billion, and wholesale electricity cost savings (based on optimistic industry estimates) totaled $1.6 billion (Figure 5; note the figure shows annual saving). This produces a simple return on investment over the period of $1.30 for every dollar spent. The total estimated cost of the energy efficiency and solar energy scenario from 2017 to 2030 was $1.1 billion and the savings were $2.3 billion (without discounting for future value). This produces a simple return on investment of $2 for every dollar spent.

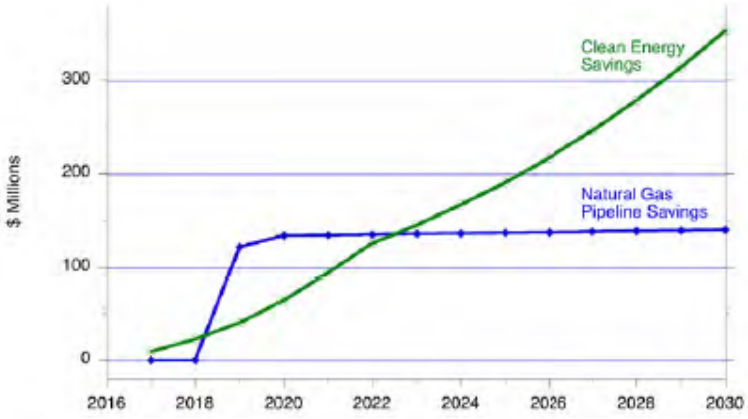
New Hampshire residents favor investment in renewable energy.

New Hampshire residents favor investment in renewable energy. In response to a Granite State Poll question[35] on priorities for energy sources in the future, by almost a 3-to-1 margin respondents gave higher priority to renewable energy sources (67 percent) compared to natural gas (24 percent). Large majorities of self-reported political liberals (88 percent) and moderates (70 percent) preferred increased use of renewable energy sources, while self-described conservatives were as likely to prioritize natural gas (46 percent) as renewable energy (45 percent).

Conclusion

Our findings suggest that there is no immediate need for New Hampshire to expand natural gas pipeline infrastructure. If the state wishes to intervene in the market by obligating ratepayer funds to reduce wholesale electricity costs, additional public investment in major pipeline infrastructure should wait until a rigorous study has been completed that models system wide natural gas flows and prices. This study should lead to an improved understanding of the difference between the technical and economic capacity of the existing system and explore opportunities to access more of the technical pipeline capacity

FIGURE 5. RESULTS FROM A SPREADSHEET MODEL COMPARING *ANNUAL* SAVINGS IN NEW HAMPSHIRE BASED ON INVESTING IN NATURAL GAS PIPELINE(S) VERSUS INVESTMENT IN ENERGY EFFICIENCY AND SOLAR ENERGY



Note: Total projected cumulative savings from 2017 to 2030 are $1.63 billion for the natural gas pipeline scenario and $2.27 billion for the clean energy scenario. **Source:** Wake et al., "New Hampshire's Electricity Markets: Natural Gas, Renewable Energy, and Energy Efficiency," 2017, Section 5, http://scholars.unh.edu/sustainability/6/.

in cost-effective ways. To date, no study of which we are aware has performed the level of rigorous analysis required to justify a major multidecadal contract obligating ratepayers, and moving ahead without such a study would essentially make ratepayers energy market speculators. Policy makers also may want to consider other options that carry less risk and a better return on investment, including better utilization of existing infrastructure and increased investment in energy efficiency and renewable energy.

Contracts for natural gas capacity that are funded by ratepayers should be conducted through a request-for-proposals (RFP) process, as recommended by the Public Utility Commission.[36] This process should examine all avenues of gas supply, including new pipelines, existing pipelines, and LNG capacity. The underlying costs and assumptions from vendor submissions should also be placed in the public domain for review. Since there is evidence that costs may be lower from more effective use of existing infrastructure, an RFP process would allow the least-cost option to be revealed through a fair, open, and competitive bidding process.[37]

Based on the detailed analysis provided in Sections 3 and 4 of the full report, and given the projected low peak-load growth and uncertainty in future energy markets, it is advisable to avoid expensive market interventions or, at minimum, to prioritize investments that have the highest return on investment, lowest projected cost, and lowest risk. This practice will serve to keep rates affordable by reducing spending on expensive utility infrastructure that has been demonstrated in the past to increase rates (for example, Merrimack Station).

The findings of this study suggest that the LNG contract scenario or renewable energy and energy efficiency investment (up to the maximal economic potential estimated by the Vermont Energy Investment Corporation to be approximately 6 percent of the total New Hampshire energy load[38]) will be the most cost-effective alternatives while also representing low financial risk to New Hampshire ratepayers. Furthermore, policies should consider the unintended or disproportionate impacts on the populations most negatively affected by increased energy prices, including large commercial and industrial users and low-income households. In conclusion, we argue that the while the utility companies' stated goal of reducing electricity costs in the State is admirable, that ironically, their strategy of expanded natural gas capacity in the region funded by ratepayers poses a significant risk of raising electricity costs further.

Data

Energy data used in this brief are from the U.S. Energy Information Administration, ICF International, Inc. and PointLogic Energy, and Gross Domestic Product and Price Index data from U.S. Department of Commerce, Bureau of Economic Analysis. We also conducted a review of prior/existing studies that focused on natural gas infrastructure, and energy efficiency and renewable energy implementation. Citations provided in the endnotes and detailed in the full report, http://scholars.unh.edu/sustainability/6/.

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About the Authors

Cameron Wake is a research professor with the Earth Systems Research Center, Institute for the Study of Earth, Oceans, and Space, and Department of Earth Sciences at the University of New Hampshire. In addition, he is Josephine A Lamprey Professor in Climate and Sustainability at UNH's Sustainability Institute (cameron.wake@unh.edu; Twitter: @TheClimateDr).

Matt Magnusson is a doctoral student in the College of Engineering and Physical Sciences at the University of New Hampshire and MBA from the UNH Peter T. Paul School of Business and Economics.

Christina Foreman is an affiliate research professor with the Earth Systems Research Center, Institute for the Study of Earth, Oceans, and Space at the University of New Hampshire. She now works as an economist in the Economic Analysis Division at the Volpe National Transportation System Center in Cambridge, Massachusetts.

Fiona Wilson is executive director of the Center for Social Innovation and Enterprise; and clinical associate professor of Social Innovation, Social Entrepreneurship, and Sustainability, Department of Management at The Peter T. Paul College of Business and Economics at the University of New Hampshire (fiona.wilson@unh.edu).

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For a thriving New England

CLF New Hampshire
27 North Main Street
Concord, NH 03301
P: 603.225.3060
F: 603.225.3059
www.clf.org

February 10, 2017

Timothy H. White, AICP
Supervisor, Mobile Sources Section
Air Resources Division
New Hampshire Department of Environmental Services
29 Hazen Drive, PO Box 95
Concord, NH 03302-0095

Via electronic mail: timothy.white@des.nh.gov

Re: Initial Proposal Regarding Use of Potential VW Settlement Funding

Dear Mr. White:

On behalf of the Conservation Law Foundation (CLF), we are pleased to offer comments on New Hampshire's *Initial Proposal Regarding Use of Potential Funding* ("Initial Proposal") associated with the partial consent decree entered on October 25, 2016 to resolve certain violations of federal emissions standards by Volkswagen companies ("VW Settlement").[1]

Founded in 1966, CLF is a nonprofit, member-supported organization that works to solve environmental problems threatening the people, natural resources, and communities of New England. In the face of global climate change, CLF and its members have a significant interest in solutions to reduce greenhouse gas emissions from our transportation system while improving air quality and mitigating adverse public-health impacts.

The $29,544,297.76 available to the State of New Hampshire through the VW Settlement offers a significant opportunity to jump start New Hampshire's transition to clean, electrified transportation. We commend the New Hampshire Department of Environmental Services (NHDES) for proactively preparing and soliciting public input on the Initial Proposal. As further outlined below, **we urge New Hampshire to utilize VW Settlement funds to accelerate investments in electric vehicles (EVs) and EV charging infrastructure. All investments should be designed to achieve maximum reductions in greenhouse gas emissions.**

[1] *See* Order Granting the United States' Motion to Enter Proposed Amended Consent Decree, *United States v. Volkswagen AG et al.*, No. 16-cv-295 (N.D. Cal. Oct. 25, 2016) [Partial Consent Decree].

Specifically, investments should maximize clean transportation benefits across communities and reduce significant barriers to EV penetration in New Hampshire in coordination with existing programs.

1. **New Hampshire should be an Environmental Mitigation Trust beneficiary.**

We strongly urge New Hampshire to file for trust beneficiary status and capitalize on the opportunities presented by the VW Settlement funds. New Hampshire's allocation of funds will be available for expenditure in New Hampshire only if the Governor takes action to make New Hampshire a beneficiary of the VW Settlement's Environmental Mitigation Trust. The Governor must file a certification form with the court no later than 60 days after the effective date of the trust.[2]

There are only upsides to being a trust beneficiary. If the Governor does not elect to file for trust beneficiary status, New Hampshire will lose out on more than $29,500,000 in available funding for investments in clean transportation. NHDES should ensure that the Governor timely files New Hampshire's certification form in accordance with the VW Settlement terms.

2. **New Hampshire's Environmental Mitigation Trust program should include the acquisition, installation, and maintenance of EVs and EV charging infrastructure.**

Of the eligible mitigation actions under the VW Settlement, New Hampshire's Environmental Trust Mitigation program should invest in EVs and EV charging infrastructure to achieve maximum reductions in greenhouse gas emissions.

   a. **NHDES should utilize the full 15 percent of available funds for EV charging infrastructure.**

We support the Initial Proposal's commitment to utilizing the allowable maximum of 15 percent of trust funds for acquisition, installation, and maintenance of new EV charging infrastructure. We urge NHDES to stand firm on its commitment to use maximum available funds for charging infrastructure, and to prioritize expenditures that would combat EV "range anxiety" and other significant barriers to EV penetration in New Hampshire.

Per the VW Settlement, eligible EV charging infrastructure includes Level-1, Level-2, and fast-charging equipment for light duty EVs. Given the limited funding available for EV charging infrastructure, NHDES should make careful choices about what level of charging equipment to acquire. The level of charging selected should be suited to the particular installation location (e.g., more expensive fast charging equipment is more suitable to highways and other thoroughfares, while less expensive Level-1 or Level-2 charging equipment is more suitable for "long-dwell" locations such as commuter parking lots and workplaces). Overall, charging infrastructure investments should be prioritized according to whether they combat an identified barrier to EV penetration in New Hampshire. Additionally, investments should be additive and complementary to any existing federal, state, and local EV initiatives.

[2] *See* Partial Consent Decree, App. D, ¶ 4.0.

The VW Settlement allows for funds to be invested in charging infrastructure at workplaces and multi-unit dwellings as well as public locations. CLF recognizes the importance of expanding the availability of charging infrastructure at workplaces and multi-unit dwellings, as workplaces and homes are the most-utilized locations for EV charging. A federal survey found, for instance, that people are 20 times more likely to drive an EV if they have access to workplace charging.[3] EVs benefit everyone through reduced emissions of greenhouse gases and other dangerous air pollutants. Engaging businesses and property owners in the effort to expand EV infrastructure can be beneficial for other reasons, too. Private contributions to the costs of charging infrastructure can amplify the impact of public investments, and efforts by workplaces and property owners to promote their EV infrastructure can advance public education about EVs.

Because workplace and residential charging infrastructure can have wide-ranging public benefits, CLF would support the investment of VW Settlement funds in a well-designed program to promote charging infrastructure at workplaces and/or multi-unit dwellings. Given the nature of the VW Settlement, including the broad public harms it is intended to address, we encourage NHDES to prioritize such investments to maximize anticipated public benefits. For instance, NHDES should consider requiring any investments in workplace or multi-unit dwelling charging infrastructure to serve a minimum number of employees or residents, to include an outreach and education component, and, at least for workplace charging, to incorporate a certain level of private matching funds.[4]

b. NHDES should prioritize investments in electrification.

The Initial Proposal would deem all mitigation actions allowed under the VW Settlement to be eligible under New Hampshire's Environmental Mitigation Trust program. We consider this approach to be overbroad, insufficiently forward-looking, and incompatible with New Hampshire's long-term climate and air quality goals.[5] Excepting the 15 percent of VW Settlement funds that should be reserved for EV charging infrastructure, CLF urges NHDES to invest 100 percent of the remaining funds to repower aging diesel vehicles with electricity.

Spending limited VW Settlement funds on older, dirtier technologies such as diesel, compressed natural gas, propane, or other alternative fuels would lock in pollution for the future during a critical period when aggressive decarbonization is essential to forestall the most extreme impacts of climate change. The VW Settlement funds represent a valuable one-time capital infusion that could help advance the market for newer zero-emission vehicle technologies while also permitting New Hampshire to afford beneficial technologies that would otherwise be at a price premium.

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[4] Massachusetts' Electric Vehicle Incentive Program (MassEVIP) is a useful model of a workplace charging grant program. MassEVIP provides up to 50 percent (up to $25,000) of the hardware costs for employers with 15 or more employees to install Level-1 or -2 charging infrastructure. For more information, *see* http://www.mass.gov/eea/agencies/massdep/air/grants/workplace-charging.html.

[5] *See* N.H. CLIMATE CHANGE POLICY TASK FORCE, THE NEW HAMPSHIRE CLIMATE ACTION PLAN (2009) (setting forth a greenhouse gas emissions reduction goal for New Hampshire of 80 percent below 1990 levels by 2050).

In particular, we encourage investments in electric transit buses, which would both expand public access to clean transportation and increase the visibility of EVs. Although the capital cost of an electric bus is typically greater than alternative bus technologies, the full cost of ownership is lower due to reduced fueling and maintenance costs over the life of the EV. In addition, as the electric grid modernizes, electric buses and other EVs have the potential to provide valuable grid reliability benefits to all electricity users.

We urge NHDES to consider investment models and strategies that would maximize the impact of VW Settlement funds. For instance, NHDES should:

- Target the oldest diesel vehicles for retirement and repowering, as newer models already have far lower nitrogen oxide and particulate matter emissions.
- Where possible, leverage supplemental local, state, and federal funding sources (such as federal incentives for EV purchases) that can be combined with VW Settlement funds to amplify investment impacts.
- Where appropriate, use VW Settlement funds to enhance investments that would occur anyway, thus enabling cost-effective investment in more expensive zero-emission vehicle technologies (e.g., where a bus must be replaced regardless of VW settlement funds, VW Settlement funds could be used to pay the incremental cost of purchasing an electric bus versus a new diesel or other alternative fuel bus).
- Reject any proposals to collaborate with private companies on private environmental mitigation commitments.
- Consider using VW Settlement funds to establish a revolving, no-interest loan program for local governments with limited resources. Local agencies could pay back loans over time as they realize the full lifecycle cost savings of EV ownership.
- Consider using VW Settlement funds to establish a continuing grant program for acquisition of EVs, which could be coupled with outside financing to amplify the clean energy and public health impact of limited funds.[6]
- Explore opportunities to enhance EV purchasing power through coordination with other states, localities, and/or regional entities on purchases or bidding processes, or through bulk or grouped projects.[7]

[6] One model for such a program is California's Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP), which offers point-of-sale incentives for acquisition of low-emission trucks and buses. For more information, *see* https://www.californiahvip.org.

[7] A useful model is the joint request for information (RFI) from automakers recently issued by Los Angeles, San Francisco, Seattle, and Portland, OR, which is open to all cities that participate in the Mayors National Climate Action Agenda. The RFI aims to obtain utility vehicles, trucks, and medium- and heavy-duty vehicles such as delivery bans, trash vehicles, and transit buses at a lower price.

c. NHDES should prioritize electrification investments that will benefit communities that suffer disproportionate air pollution burdens.

In general, we urge NHDES to prioritize investments in areas that suffer from high air pollution burdens. We also support investments that would expand the access of low-income communities to clean transportation. Repowering diesel vehicles with electricity would provide great benefits to local communities. Specifically, NHDES should evaluate opportunities to leverage VW Settlement funds to improve public transit in transit-dependent communities through the acquisition of electric buses.

* * *

Thank you for your consideration of these comments.

Sincerely,

Megan Herzog
Staff Attorney

Tom Irwin
Vice President & Director, CLF New Hampshire

Please find attached comments from the New England Power Generators Association (NEPGA) on updates to New Hampshire's 10-year State Energy Strategy. NEPGA thanks the Office of Strategic Initiatives for the opportunity to provide written comment. Please feel free to contact me directly should you have any questions.

Sincerely,

Dan Collins

Daniel P. Collins
Director of Government Affairs
New England Power Generators Association
dcollins@nepga.org
office: 617 902-2344
mobile: 339 236-0433

NEPGA
NEW ENGLAND POWER GENERATORS ASSOCIATION, INC.

33 Broad St, 7th Floor, Boston, MA 02109
(t) 617-902-2354 (f) 617-902-2349
www.nepga.org

Comments on Updates to New Hampshire's 10-Year State Energy Strategy

The New England Power Generators Association (NEPGA)[1] appreciates the opportunity to provide written testimony as the Office of Strategic Initiatives (OSI) considers updates to New Hampshire's State Energy Strategy (SES). The SES offers an important opportunity for New Hampshire to assess its current energy situation and plot a strategic path forward informed by recent history and expectations to come. As the process moves forward, NEPGA encourages OSI to consider the contributions of the competitive wholesale electricity markets to reduce energy costs, attracts investments, and ensure a reliable electricity supply.

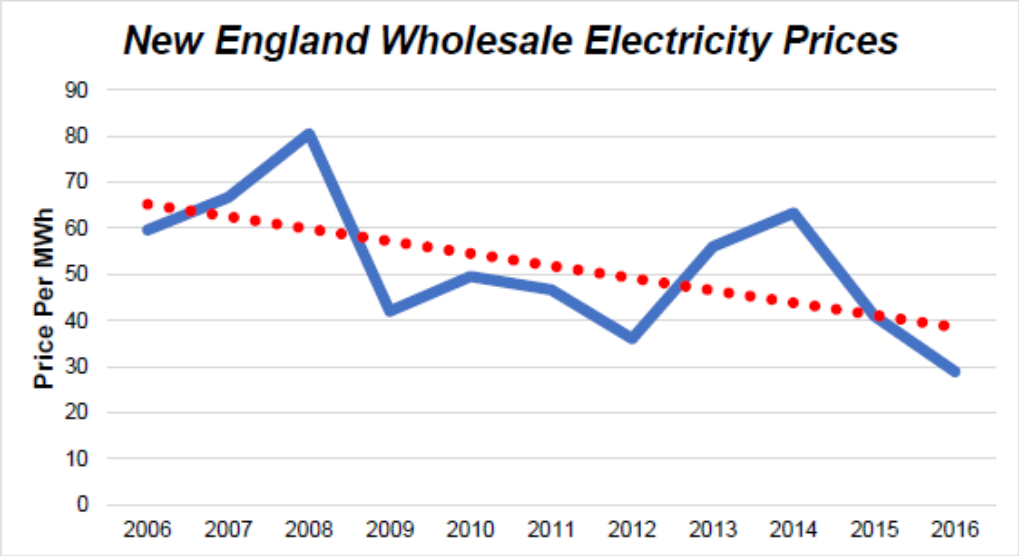
NEPGA is the trade association representing competitive electric generating companies in New England. NEPGA's member companies operate approximately 26,000 megawatts (MW), or 80% of all generating capacity in the region. In New Hampshire, NEPGA represents over 2,700 MW, accounting for roughly two-thirds of the state's electric generating capacity. These facilities provide nearly 800 skilled manufacturing jobs in New Hampshire and account for over $46 million in state and local taxes annually. NEPGA's mission is to support competitive wholesale electricity markets in New England. We believe that open markets guided by stable public policies are the best means to provide reliable and competitively-priced electricity for consumers. A sensible, market-based approach furthers economic development, jobs and balanced environmental policy for the region.

Benefits of a Competitive Electricity Market

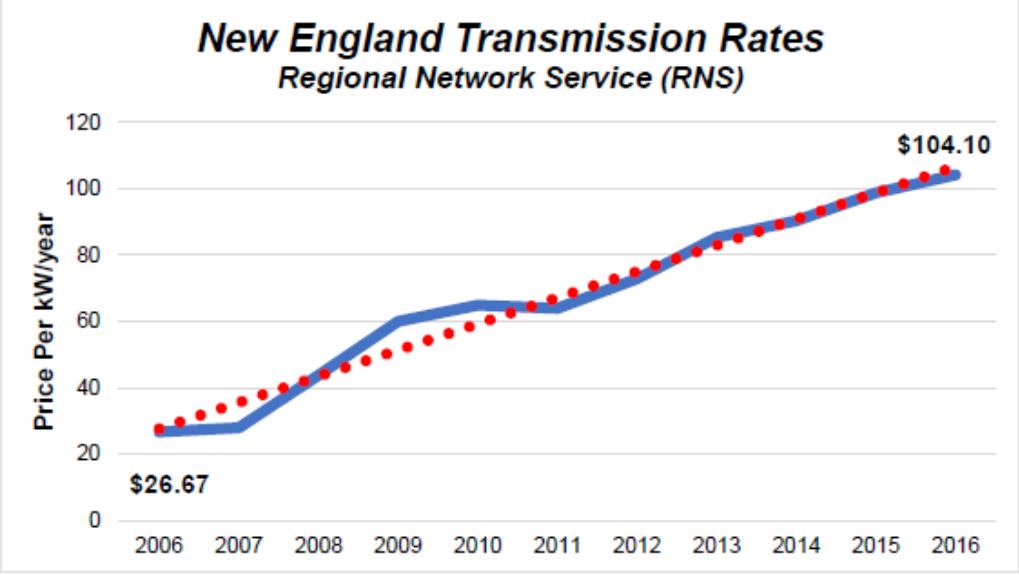
In 1996, New Hampshire passed the *Electricity Utility Restructuring Act* (RSA 374-F), which created competition for electricity supply in the state. In the more than 20 years since, competitive generators have invested tens of billions of dollars in New Hampshire and across New England for the opportunity to compete in the marketplace. These generators provide competitively-priced, reliable and environmentally responsible electricity for consumers without guaranteed cost recovery or returns. Instead, generators today make significant investment decisions based on whether they will have an opportunity to compete against all others to recover their costs.

[1] The comments expressed herein represent those of NEPGA as an organization, but not necessarily those of any particular member.

The results of the state's restructuring of its electricity industry are remarkable. In the last ten years wholesale electricity prices – the prices coming out of the power plants themselves and sold into the region's central marketplace – have fallen by over 50%.[2]



Over that same time, however, the cost of large-scale transmission in New England has increased nearly 400%.[3]



[2] https://www.iso-ne.com/static-assets/documents/2017/02/20170227_pr_2016_price_release.pdf
[3] https://www.iso-ne.com/static-assets/documents/2015/12/section2-rate-summary.xls

2016 was in fact the lowest average wholesale electricity price year since at least 2003. Not only did this beat the previous record ($36.09/MWh in 2012) but it was 20% below the prior record price. Beyond the absolute figures, it is worth noting that PJM also saw its lowest wholesale electricity prices in 2016 ($28.78/MWh).[4] With both New England and PJM hitting record low prices in the same year, there was only a $.16/MWh difference. While there are structural, policy, economic and market-design differences between New England and PJM, which may explain price differences between the regions, the price convergence seen in 2016 is notable.

At the same time, as intense competition is occurring in the wholesale energy market, generators are making investments to competitively replace retiring resources. 4,200 MW of generation capacity in New England has either retired or announced an intent to retire in the next several years. In response, 4,120 MW of new generating capacity has been selected in the five most recent Forward Capacity Auctions to come online by June 1, 2020. These investments represent roughly 15% of New England peak demand and are being made without state guarantees or subsidies.[5]

To the degree additional plant retirements are announced, over 13,000 MW of additional plants are currently in the ISO New England interconnection queue. While only a fraction of those 13,000 MW is likely to be needed, it shows the interest and ability of the competitive marketplace to make the investments necessary to support reliability and competitive pricing for New Hampshire and New England.

Clearly, some of the investments in state and federally-regulated transmission and distribution networks are necessary and appropriate. Similarly, a number of public policy programs provide net benefits for consumers, increase efficiency and improve environmental performance. NEPGA provides this background and information, however, because understanding what is driving consumer costs and the impacts of competition in the wholesale electricity market is key to plotting a path forward for New Hampshire. The competitive electricity market in New Hampshire is providing tremendous benefits to consumers. Far from any perceived "crisis," the market is driving historically low wholesale electricity prices while providing billions of dollars in investments to meet ever-increasing performance and reliability requirements. But these investments should not be taken for granted with policies that have the potential to undermine the progress made over the last 20 years. NEPGA is heartened that with the completion of restructuring on the horizon with the divestiture of the last of the Eversource rate-base generation fleet, all New Hampshire consumers will soon benefit from an open, competitive electricity supply market.

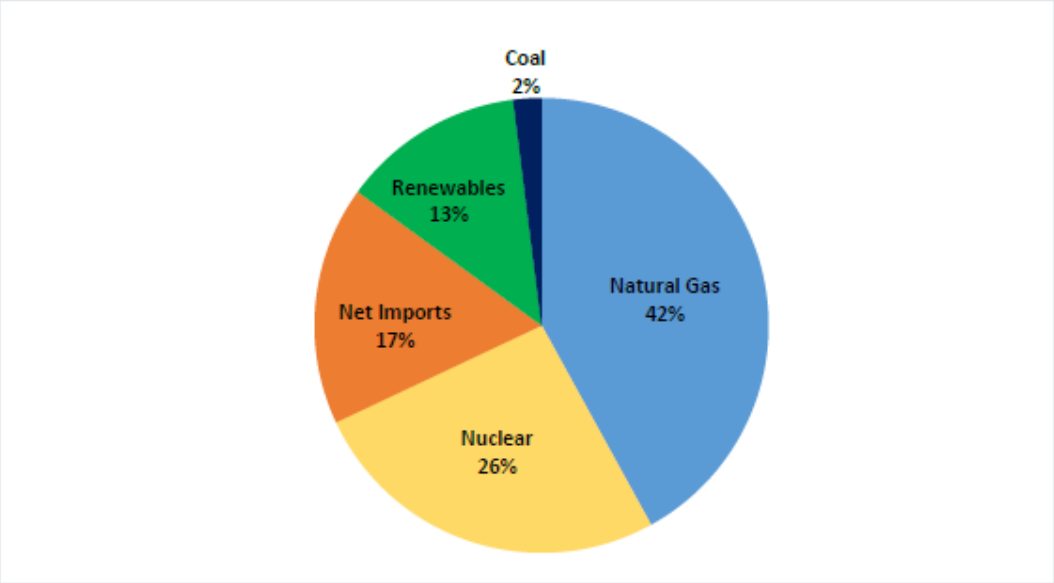
Winter Fuel Supply and Fuel Adequacy

[4] 2016 State of the Market Report for PJM," Monitoring Analytics, March 9, 2017. http://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2016.shtml

Power generation fuel supply and reliability have been built into the New England wholesale electricity market and are the responsibility of resource owners in the region. This can be principally seen through the performance obligations in the Forward Capacity Market (FCM). Under the reformed FCM design, each plant in New Hampshire and across New England is obligated to make the necessary fuel procurement arrangements to ensure that the resource can respond to ISO-NE dispatch instructions.

This is in addition to the other investments needed to ensure a plant's performance to preserve reliability. NEPGA members today are making those investments to meet their electric delivery obligations and have a strong track record of delivering reliable service at competitive prices. As exemplified in the data highlighted above, the wholesale market is driving highly competitive electricity prices for consumers.

The power generation fleet behind that also remains a diverse and resilient one. In 2016, New England's electricity demand was met reliably, competitively and from one of the cleanest supply mixes in the country, as shown in the chart below.[5]



Even as the generation fleet changes, the ability to reliably and competitively meet demand continues. The events of just this summer serve as a prime example. On May 31, 2017, the 1,500-MW Brayton Point Power Station, the second largest power plant in all of New England, was permanently shut down. Brayton Point was a coal and oil-fired facility. As shown above, despite a high nameplate capacity value, such facilities

[5] ISO New England Resource Mix - https://www.iso-ne.com/isoexpress/web/reports/load-and-demand//tree/net-ener-peak-load. Net imports are primarily from Quebec and New York interties. Oil, not listed, represented under .5% of electric demand.

provided very few of the megawatt-hours in 2016. Nonetheless, the retirement of such a large facility attracted substantial media and policymaker attention.

On June 1, 2017, coincident with the FCA 8 Capacity Commitment Period, the 700-MW Footprint Power Station was scheduled to come online. Due to construction delays, that facility did not arrive as scheduled and has yet to come online. Even with this capacity deficiency, the wholesale electricity market has driven continued competitive prices and strong reliability the entire summer. June 2017 was among the lowest wholesale electricity months since 2003 with average prices of $23.93/MWh, despite higher than average cooling degree days.[6] July followed with a very competitive average price of $26.62/MWh.[7] August's average wholesale price of $23.77/MWh was the seventh lowest wholesale electricity month since 2003, even with less generating capacity than expected.[8] September brought similarly lower average monthly prices at $26.31/MWh.[9] Overall, 2017 has seen the lowest average wholesale electricity prices over the three summer months in over 10 years, following the historically low prices in 2016, and early results for the fall appear consistent with that trend. The intense competition in the wholesale electricity market is clearly driving consumer benefits in New Hampshire and across the region.

What all of this shows is that even in the face of a dramatically different electricity supply mix from when restructuring began 20 years ago, generators are providing reliable, cost-effective and ever cleaner generation for consumers. NEPGA does not see the need for out-of-market actions to increase natural gas supplies and we oppose efforts to do so because they would undermine the competitive market outcomes and the investments being made by generators. All while, once again, putting the costs and risks of those infrastructure investments back on consumers, in clear conflict with the intent of moving to a competitive, restructured electricity industry.

Conclusion

NEPGA is grateful for this opportunity to provide input on OSI's update to the SES. Our members recognize the important role that power generation plays in that effort and we are committed to continuing to lead the way. NEPGA members are doing so by ensuring competitive wholesale electricity prices and continued investments to support reliability. NEPGA stands ready to continue building on this track record.

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[6] http://isonewswire.com/updates/2017/7/21/monthly-wholesale-electricity-prices-and-demand-in-newengla.html
[7] http://isonewswire.com/updates/2017/8/30/wholesale-electricity-prices-and-demand-in-new-englandjuly.html
[8] http://isonewswire.com/updates/2017/9/25/monthly-wholesale-electricity-prices-and-demand-in-new-engla.html
[9] http://isonewswire.com/updates/2017/10/23/monthly-wholesale-electricity-prices-and-demand-in-new-engla.html

The cost and reliability benefits experienced over the course of the last 20 years, however, are not guaranteed to continue. NEPGA is gravely concerned that certain New England state policy actions threaten to undermine the competitive market that has driven remarkable consumer benefits. NEPGA encourages New Hampshire to focus on establishing clear goals, such as examining the role of transmission and distribution charges in consumers' bills, and then work regionally to appropriately reflect those policy priorities into the market, without picking winning and losing resources or technologies. This approach offers the most fair, competitive and lowest risk path for consumers while ensuring a leadership position for New Hampshire on these important issues.

Dear Sir or Madam:

Attached please find my personal testimony/comments for this matter, supplementing my testimony/comments embodied in the petition titled "Calling for a Great State Energy Strategy for the State on New Hampshire," previously submitted.

Thank you for your time and courtesy, and for accepting testimony/comments in this matter.

Sincerely,

Richard Husband

Litchfield, NH 03052

Richard M. Husband
10 Mallard Court
Litchfield, NH 03052
RMHusband@gmail.com

November 6, 2017

TO: The New Hampshire Office of Strategic Initiatives ("OSI")

RE: Testimony/Comments on New Hampshire's 10-Year State Energy Strategy

Dear OSI:[1]

Please accept the following as my personal comments/testimony in support of the energy strategies enumerated under the petition titled "Calling for a Great State Energy Strategy for New Hampshire" ("Petition") that has been separately submitted to the OSI on behalf of more than 300 New Hampshire residents (including me) and businesses. A copy of the Petition, without the 17-pages of signatories, is attached hereto as Exhibit "A," for your reference.

Overview

Do we want to make a *serious* effort to bring Amazon HQ2 to New Hampshire and attract other responsible 21st century businesses and jobs to New Hampshire, or are we happy with continuing to pay the PFOS/PFOA bills and other hidden costs that come with catering to mid-last century business "thinking"? Amazon makes it clear on its website, page 4 of its instructions for HQ2 proposals, and by the personal agenda of its CEO, that it strongly supports clean, green energy, particularly wind and solar, and has committed to 100% renewable energy usage for running its business, including that at HQ2 with the tens of thousands of jobs it would bring for decades. Conversely, we know that gas is dirty, its infrastructure dangerous, and it brings nothing long-term to New Hampshire but headaches and a more bottom, bottom line. *See* discussion below. Yet, New Hampshire's HQ2 proposal to Amazon misses the opportunity to commit our enormous offshore wind potential and solar development to Amazon's energy needs, while approving more gas use and infrastructure that such companies committed to sustainability only find repugnant—in Concord, Pelham/Windham, Keene and possibly Hanover/Lebanon –for the most part, over the vehement objections of citizens who, like Amazon, want to transition to green energy as soon as possible.[2] Meanwhile, too many in our government still reject climate change as real, even as unmistakable signs swirl, a narrowing window of final opportunity to address it closes, and everyone else rushes through to lead in burgeoning new green technologies…

Why are we so intent on going forward in such a backward manner?

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[1] Readers please note that, as with all URL links, you may have to right click your mouse on the blue links in this letter more than once, or wait a minute in the case of large volume documents, for access.

[2] *See* Comments filed in Public Utilities Commission ("PUC") Docket Nos. DG 16-1770, DG 17-068 and DG 16-852.

THE CASE FOR THE PETITION'S ENERGY STRATEGIES

> "This assessment concludes, based on extensive evidence, that it is extremely likely that human activities, especially emissions of greenhouse gases, are the dominant cause of the observed warming since the mid-20th Century. For the warming over the last century, there is no convincing alternative explanation supported by the extent of the observational evidence …"

"Trump administration report attributes climate change to 'human activities'…"

Politically, rationally, economically, it has become impossible to ignore the obvious.

Polls show that most American voters are concerned about climate change, even most Republicans after the recent hurricanes, and most want more action, including from corporations and industry, to address it. New Hampshire citizens made this clear a decade ago: by a more than two-thirds majority of cities and towns (more than 160 out of 234), New Hampshire citizens "support a resolution asking the federal government to address climate change and to develop research initiatives to create 'innovative energy technologies.'" With good reason: climate change is *science*—long-established science, not a figment of recent politics, with the basic physics and chemistry of the greenhouse effect (why carbon gases warm the planet) being established in the 19th century by European scientists long before the current U.S. debate. Moreover, it is science supported by an overwhelming consensus of those actually qualified to opine on the matter.[3] As noted by NASA:

> "Multiple studies published in peer-reviewed scientific journals show that 97 percent or more of actively publishing climate scientists agree: Climate-warming trends over the past century are extremely likely due to human activities. In addition, most of the leading scientific organizations worldwide have issued public statements endorsing this position."

For a partial list of these resources, please click here. The "scientific evidence … is unequivocable" and, as more than 2,300 scientists—including **22 Noble Prize winners**—have urged, science must be respected. How can we say that the same field of professionals and sphere of intellect that we have relied on to take us to the outer reaches of our galaxy cannot be trusted to understand basic processes of our own planet—especially when NASA's own scientists agree that climate change is real? What real opposing "evidence" worth the risk to our children, grandchildren, and all succeeding generations does the denial camp have? Hired guns and crackpots can be found to support any argument, but no reputable scientific *organization* stands denies climate change, Man's impact on it and thus the ability to effect positive change. Are "can't tell … it may not be as bad as they say … nobody knows for sure" opinions that we really want to chance that risk on? Despite the political rhetoric, I would hope that, if put to an honest vote, all would agree: when *a lot* of proven

[3] There is a not so fine line between self-confidence and inexcusable, fatal arrogance. *Smart, successful, unregretting* business owners and other citizens do not turn their backs on the opinions of those eminently more qualified than themselves in a given field: their smiles come from not representing themselves in court, engineering their own plans, drilling their own fillings and whistling while they do their own wiring—but by relying on those who, at the end of the day, won't leave their world in ashes.

experts on a subject, supported by overwhelming evidence, say that something very doable is the only chance your grandchildren have to survive, shrugging the matter off is the last thing on your mind; you work on getting it done. 2014 and 2015 *were* the hottest years on record, until we followed them by another record breaker in 2016. Indeed, "[s]ince 1976, every year including 2015 has had an average global temperature warmer than the long-term average," and 16 of the 17 warmest years on record have occurred since 2001. Clearly, climate change is already upon us. As is shown by the 195 signatories to the Paris Agreement, every civilized nation of the world formally recognizes this but us—the good old U.S.[4] Certainly, the Pentagon believes it. As do those in the private sector most concerned with cataclysmic risks, insurance companies—which call climate change "the mother of all risks."

From a business/economic standpoint alone, it is ludicrous to ignore climate change. Smart business leaders worldwide are demanding recognition and action, realizing that, as "climate change will cause damage to facilities, disrupt supply and distribution chains; threaten power supplies; jeopardize the global food and water resources; and add overall uncertainty to the marketplace thus increasing the cost of doing business," it will cost far, far less to bite the bullet, be proactive and incur some preventative expense up front rather than undertaken massive remediation efforts later. For example, on the national level:

> "One study shows that if global warming emissions continue to grow unabated—a high-emissions scenario—the annual economic impact of more severe hurricanes, residential real-estate losses to sea-level rise, and growing water and energy costs could reach 1.4 percent of GDP by 2025, and 1.9 percent by 2100 (Ackerman and Stanton 2008)."

See Climate Change in the United States: The Prohibitive Costs of Inaction. Additionally, the U.S. shares in the 4.6 trillion annual worldwide cost of pollution largely associated with the carbon/fossil fuel use associated with carbon/greenhouse gas emissions and climate change. While businesses duck their own fair share, they do have to absorb part of it: through taxes used for remedial efforts, through increases in insurance premiums, through uninsured losses they have to pick up on their own, through increased risks to our economy.

As specifically concerns New Hampshire and New Hampshire businesses, climate change comes with a lot of costs:

(1) **to one of our leading industries, tourism**, by its negative impacts on winter recreation, hunting (by the decimation of the moose population), fishing and foliage—threatening hundreds of millions in annual revenues;
(2) **to our sugar industry**, as "[s]ugar maples are extremely susceptible to mid-winter thaws and summer droughts.";

[4] While Syria is also a holdout from the Paris Agreement: sorry, Syria, with your current regime and war crimes, you cannot be considered "civilized" It should disturb those reading this as much as me that we sit alone in a bucket with Syria—*Syria*—isolated from the rest of the world, alienating our allies who are making the required sacrifices, on such a key global pact. Why have we not already done our part in New Hampshire to show that we do not agree with this madness by joining the U.S. Climate Alliance? Please rectify this now: 70% of Americans want to stick to the terms and goals of the Paris Agreement.

(3) **to our moose and loon populations (also fueling tourism)**: in fact, climate change is the leading cause of their decline. Moose hunters and wildlife watchers inject over $340 million a year into the New Hampshire economy;
(4) **to our dairy industry**, by increasing, intensifying droughts;
(5) **to agriculture**, an annual $330 billion U.S. industry, from climate change induced stresses ranging from extreme weather events to increased insect pests and diseases;
(6) **to our health and health costs**, by the increase in the tick population and associated increase in lyme disease, by all of the respiratory and other problems caused by breathing the pollutants from fossil fuels. New Hampshire is experiencing one of the largest state increases in its tick population, and the rate of Lyme disease has doubled in New Hampshire since 1991, *see id*. ("Among the states where Lyme disease is most common, New Hampshire, Maine, and Vermont have experienced the largest increases in reported case rates since 1991 …"). New Hampshire also has an enormous number of impacted asthma sufferers. "New Hampshire's asthma rate is among the highest in the nation. Approximately 110,000 NH adults and 25,000 NH children have asthma.";
(7) **to our seacoast homes and infrastructure**: one study has determined (at page 23) that it will cost just three New Hampshire towns between $1.9 and $2.9 billion to address the impacts of climate change and another study concluded that over 7,000 New Hampshire homes could be under water by 2100 due to sea rise caused by climate change;
(8) **to taxpayers and ratepayers** in cleaning up from ice and other destructive storms, and addressing all of the above other harms;
(9) **to everyone's cost of insurance** as the price of addressing all of the negatives rise for insurance companies.

We will go bankrupt at every level if we do not meet climate change head on, right *now*.

However, we can meet it head on, right now—as we have met greater challenges in the past, *see, e.g.*, the Revolutionary War, WWII—and eliminating all of its gargantuan hidden costs will only grow our economy. "Gross domestic product, adjusted for inflation, has increased by 250 percent since 1970, when President Richard Nixon signed the Clean Air Act. Over the same period, concentrations of such common air pollutants as lead, particulate matter and sulfur dioxide have dropped in the U.S. by 70 percent.".

But climate change is about far more than money. Millions will die from global warming, with children among the most vulnerable.

The situation is truly dire, with a rapidly closing window for action. At the end of June, climate change experts, including former United Nations climate chief Christiana Figueres and Hans Joachim Schellnhuber of the Intergovernmental Panel on Climate Change, published a letter in the journal *Nature* warning that an immediate, monumental acceleration in climate change efforts is needed to prevent the worst effects of global warming. Likewise, two different studies published in the journal *Nature Climate Change* on July 31, 2017 conclude that only a rapid escalation in climate action will prevent rising seas, mass extinctions, super droughts, increased wildfires, more intense hurricanes, decreased crops, fresh water and the melting of the Artic. We cannot responsibly continue to ignore all of the warning signs: record-breaking global temperatures year after year,

New Hampshire's own prolonged recent drought, the Santa Rosa wildfires--the U.S was just hit by three Category 4 hurricanes in one year! In records going back to 1851, two Category 4 hurricanes striking the contiguous U.S. states in one year is unprecedented.

It really is this simple: *if we want to leave a real future to future generations, we must get a lot more serious, a lot faster, about addressing climate change.*

This means **less, not more** greenhouse gas emissions.

Of course, as emissions of methane, which comprises roughly 95% of today's "natural" gas, are a major greenhouse gas, any sincere effort to climate change must include curtailing reliance on gas to reduce methane emissions. *Increasing*, rather than reducing, methane emissions, as New Hampshire is doing by continually approving more gas use through its PUC,[5] brings us that much closer, that much faster, to the edge. Such approvals exacerbate the crisis in many ways:

(A) more gas approvals require more gas and gas infrastructure and gas drilling, production and infrastructure leak enormous amounts of methane into the atmosphere—original EPA estimates were wrong and drastically underestimated the impact of the use of gas on climate change;

(B) more gas approvals mean a larger volume, longer-term commitment to gas as approvals eventually lead to the need for more pipelines—and pipelines require 20-year commitments. Indeed, Liberty Utilities claimed at the end of 2014 that the Northeast Energy Direct ("NED") pipeline project was needed to address gas shortages starting as early as the winter of 2016-17. *See* Table II on pages 16-17 of DaFonte Testimony in PUC Docket No. DG 14-380. Since then, all Liberty Utilities and the state have done is increase the demand on the utility's gas supplies;

(C) carbon dioxide, the oil/coal greenhouse gas getting most of the attention, has a more protracted effect; but, "[w]hile CO2 persists in the atmosphere for centuries, or even millennia, methane warms the planet on steroids for a decade or two before decaying to CO2" and "[i]n those short decades, methane warms the planet by 86 times as much as CO2.

Contrary to initial hopes that "natural" gas was "the clean bridge fuel solution" to navigate us around climate change, it will not get us there—but there are just too many other reasonable citizen objections to its use to continue down the gas path, anyway:

1. Gas pipelines are ticking time bombs. The industry claims that they are safe, but how can they be deemed safe when they keep exploding —again and again and again and again—and their "incineration zones" may extend for hundreds of feet? *See* Page 14 List of Explosions. Please take a look at some of the horrific damage and injuries described on page 14 of the last link. Children should not be playing in yards with pipelines running through them—they should not be living anywhere near pipelines, period;
2. Today's gas is not "natural" or "clean," as touted , but is contaminated by the unnatural hydraulic fracturing ("fracking") process and contains numerous carcinogens, hazardous chemicals, air pollutants, and other unhealthy impurities.

[5] For Concord, Pelham/Windham, Keene and possibly Hanover/Lebanon, as noted above.

See, e.g., "California's Fracking Fluids: the Chemical Recipe," by Tasha Stoiber, et. al. (EWG; August 2015). Study after study warns us that hydraulically fractured ("fracked") gas releases, from gas drilling, production, pipeline and other infrastructure leaks and emissions, cause health problems. *See, e.g., id.,* "Gas Compressors and Nose Bleeds," by Jessica Cohen (Fall 2015); "Porter Ranch Gas Leak Triggers State of Emergency in California," January 7, 2016 CNN online news article; "Potential Hazards of Air Pollutant Emissions from Unconventional Oil and Natural Gas Operations on the Respiratory Health of Children and Infants" by Ellen Webb, et. al. (2014; published in Reviews on Environmental Health, 2016); "Madison County, New York Department of Health Comments to the Federal Energy Regulatory Committee," prepared for Madison County Department of Health by Thimble Creek Research (September 30, 2014), pp. 14-28; "Gas Patch Roulette: How Shale Gas Development Risks Public Health in Pennsylvania," by Nadia Steinzor, et. al. (October 2012); "Human Health Impacts Associated with Chemicals and Pathways of Exposure from the Development of Shale Gas Plays," by Wilma Subra Subra Company (January 9, 2012). But, our government does not seem to care.

Some of us in New Hampshire have been working to identify the ingredients in the gas used in our state to appropriately address and prevent potential health problems, but identification is extremely difficult as "Oil and gas companies refuse to disclose 10 percent of the hundreds of chemicals they use during hydraulic fracturing ...". Nevertheless, we have been able to determine from studies that **the gas used in New Hampshire likely contains over two dozen regulated toxic air pollutants under Env-A 1400**, which are emitted into our air through leaks and other releases from gas infrastructure, including such horrible poisons and/or carcinogens for children to breathe as formaldehyde, *radioactive* lead, benzene, cadmium and, perhaps, mercury.[6] Not surprisingly, where gas compressor stations are found, you may also find this—and that is only in the short-term. While fracked gas has not been around long enough for long-term studies, we should expect that chronic exposure to the known nature of the chemicals we are dealing with only brings worse. A government obligated to protect citizens should not allow this, of course.[7] But, to the contrary, a recent shocking PUC decision essentially determined that "gas is gas" and not subject to public scrutiny, so long as the industry continues to call it "natural." *See* PUC Order No. 26,065 in DG 17-068. Thus, we are enabling the continued concealment of not only the terrible chemicals we reasonably suspect are already in the fracked gas we use, but, should the gas industry decide that it is advantageous and "proprietary," the injection of even deadlier undisclosed toxins into the mix;

[6] For those desiring backup, please e-mail me at RMHusband@gmail.com and I will give you plenty—and the rest when the industry finally fully discloses what is in fracked gas. It is a real "crap cocktail," and lunacy to expose citizens to the stuff—to expose *children* to whatever causes this.

[7] Some seem to see the "solution" as just making sure that *New Hampshire* children are not exposed to it, *i.e.*, that the pipeline infrastructure causing this is located in Massachusetts, or anywhere outside of our borders. But, it makes no moral difference where she is located—this is wrong; and, when we use gas, we are complicit from the cause to the outcome.

3. Beginning with construction, pipeline projects cause enormous damage to the environment and natural resources—rivers, drinking water aquifers, wetlands, wildlife and conservation areas, *etc*., *etc*., *etc*. A good example of this damage is the harm that would have been caused by the recently contemplated Northeast Energy Direct ("NED") high pressure gas pipeline project, designed to cut through more than 70 miles of New Hampshire.[8] As described in a pleading filed by impacted municipalities contesting the project:

> "The NED pipeline [would have] cut through numerous water bodies, wetlands and aquifers along its route across New Hampshire and potentially compromise, among other areas, the following:
>
> - Souhegan River, which it [would have crossed] six times
> - Brooks and streams (22 in 15 towns)
> - Aquifers (13)
> - Ponds/lakes (11, largest, Scott Pond, is 134 acres)
> - Wetlands (over 27, numerous vernal pools)
> - Municipal water systems …
> - Private wells …
> - Numerous watersheds, including the headwaters of Tully Brook, East Asheulot, Miller [sic] River, and Middle Connecticut
>
> Among many foreseeable impacts, blasting, horizontal drilling and other construction operations would impact many of these water resources … Of particular concern is the hydrogeology of the region, where a massive underground pipeline corridor could serve as a conduit for groundwater contamination between aquifers, river basins and other water resources that would otherwise be isolated from one another …"

See pages 12-13 of this pleading. In manufacturing the need for a new pipeline, how can our government quickly forget how many towns and citizens are so negatively impacted by these projects?—18 towns and more than 160,000 citizens in New Hampshire alone with NED;[9]

4. Gas pipeline projects result in the forced taking of citizen property by federal eminent domain under 15 U.S.C. §717f(h). Unfortunately, backed by favorable federal law and an army of lawyers, pipeline companies have little incentive to take entire affected properties or pay fair value for the property they do take, often leaving property owners not only with a pipeline, but also with substantially devalued, unmarketable homes they fear to even live in. Eminent domain is

[8] For those surmising that I am a "NIMBY" (acronym for "not in my back yard"): NED was never planned to run through my property; rather, as with the vast majority of NED and other pipeline opponents, my opposition was/is grounded in all of the other gas negatives discussed herein.

[9] The 18 New Hampshire municipalities along the planned route for the NED project had estimated 2014 populations, totaling 161,080, as follows: Amherst (11,269), Brookline (5,111), Fitzwilliam (2,389), Greenville (2,074), Hollis (7,722), Hudson (24,668), Litchfield (8,363), Londonderry (24,305), Mason (1,391), Merrimack (25,408), Milford (15, 209), New Ipswich (5,115), Pelham (13,069), Richmond (1,161), Rindge (5,980), Temple (1,380), Troy (2,141) and Winchester (4,325). *See* here. When NED 2.0 or another pipeline rips through these or other communities, citizens will not forget who brought it to their doors when they go to the polls.

particularly hard on the elderly, as their home is often the *only* asset that they can count on for retirement, and any forced taking of its worth essentially rips that amount right out of their bank account. Pipeline takings are also contrary to New Hampshire law and values, as they result in the taking of private property for corporate profit, which is expressly prohibited under an amendment to the "Bill of Rights" of our state constitution passed by an overwhelming majority of 85% of New Hampshire voters just a decade ago;

5. Gas is blocking the exit out of this mess. As discussed, we have *maybe* years—certainly not decades—to right our ship and, while gas is the "quick-fix energy solution" of many, as renewables generally cannot compete with the volume of customers a pipeline contract can serve, the large, long-term commitments to gas that come with pipelines suffocate the growth of green power.

WE CANNOT INCH ANY CLOSER TO THE EDGE—AND WE NEED AGGRESSIVE ENERGY STRATEGIES TO ADDRESS CLIMATE CHANGE, LIKE THOSE OFFERED BY THE PETITION, TO GET US OFF IT.

Stop committing us to more gas and our progeny to an uninhabitable world—**please!**

Please, listen to the people, not special interests.[10] While lobbyists talk more fracked gas and fracked gas infrastructure, remember that citizens *demand* action on climate change by those measures Concord itself has circled as the only responsible solution: energy efficiency and transitioning to more diverse, *clean* sources of energy, through the promotion of renewables—not gas. Only this will "protect the safety and health of the citizens, the physical environment of the state, and the future supplies of resources" as is required by our official state energy policy codified under R.S.A. 378:37. Although our current "New Hampshire 10-Year State Energy Strategy," sets us on this path, we can and must pursue it faster to win the race against all of the accelerating harms of climate change, as citizens call for under the Petition.

New Hampshire does not even need more gas. If we do not artificially *create* a "need," we have, at worst, only a "peak demand," not a "normal demand," problem with gas, and, since the unusually long and harsh New England winter of 2013-2014 which resulted in gas shortages and price spikes that raised the issue to begin with, long-term contracts have been placed to meet any shortages by liquid natural gas ("LNG"). In fact, researchers have recently charged that even the perceived "peak demand" problem was itself artificially created, by Eversource constraining gas pipeline capacity for years—costing electric ratepayers billions: Eversource denies it, of course, but its substantial interest in Algonquin Gas Transmission, LLC, the owner of the Access Northeast pipeline project, does raise eyebrows.[11]

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[10] In 2014 and 2015 alone, Kinder Morgan, owner of the NED project, spent more than $120,000.00 lobbying in New Hampshire, "more than any other interest, non-profit, or labor organization."

[11] Eversource owns Eversource Energy Transmission Ventures, Inc., a holding company, which, in turn, owns Eversource Gas Transmission, LLC, a holding company "formed to hold [Eversource]'s 40% Class B member interest in Algonquin Gas Transmission, LLC." *See* List of Affiliates on the Eversource website. Eversource claims that capacity on the Access Northeast pipeline project—which needs customers like Eversource for approval, of course—is necessary to meet its electric generation needs. *See* PUC Docket No. DE 16-241.

Jobs and business/economic growth are great, but more gas pipelines are *not* their lifelines. While pipeline projects are painted as job-creators, they actually offer little employment beyond short-term construction work: the NED project, for example, would have resulted in only a handful of permanent new jobs for New Hampshire citizens. For those who claim the gas would have also resulted in huge energy savings allowing for more business/economic growth:

1. "Energy savings" are a well-marketed myth. New Hampshire heard all about these "savings" with the NED pipeline project, but the only quantifiable, *potential* savings on energy was miniscule —$5.00 or less a month for the average ratepayer. *See* February 19, 2015 New Hampshire Business Review online article (noting that two studies projected NED –associated ratepayer savings would only amount to the projected $4.16 per month savings associated with the Northern Pass project). Indeed, a study undertaken by municipalities in NED's projected path concluded that the average ratepayer would not have realized any energy savings, but *would have actually paid roughly $600 per month, or approximately $12,000* total, for the contract for the project;
2. More likely, our overdependence on gas will saddle businesses with even greater energy costs in the future. Those arguing a gas "need" usually point to the gas shortages and price spikes of the winter of 2013-2014 as proof positive. However, the OSI's predecessor, the New Hampshire Office of Energy and Planning ("OEP"), concluded that "increasing reliance on one fuel, namely natural gas, is what caused the wholesale price spikes in the winter of 2013-2014 in the first place …" *See* October 15, 2015 OEP letter to PUC, p. 2. Others agree that gas overreliance is a trap that will only get worse . Again, as our own OEP found: diversification, not overreliance, is the key to lower fuel prices. Yet, numerous gas pipeline projects are in the works for the Northeast. Our gas reliance is usually more than half of the total share of all of the available energy alternatives. Are we trying for 80% reliance? *100%*? How "cheap" will gas be when all of the gas contracts term-out, and we have no alternative but to renew them, as everything depends on gas?;
3. Energy efficiency and demand response measures provide far better approaches to energy savings. Businesses will always complain about energy costs, as they will always fight *every* expense: keeping costs down is how you stay in business. But, businesses would be greatly surprised at how much they could actually *save* on their own by energy efficiency alone, if they only made the effort. How many have replaced all of their traditional light bulbs with LEDs, properly insulated their buildings and implemented other energy efficiency measures? There are billions in energy savings to be had just by switching to Energy Star products. Are retailers and restaurants turning off their air conditioning *in the winter*? Have grocery stores closed all of their freezer and refrigerator areas? "On average, 30 percent of the energy consumed in commercial buildings is wasted. Energy efficiency is the single largest way to eliminate this waste, reduce emissions, and save money.". Likewise, how many businesses are employing reasonable response measures, *i.e.*, planning significant energy use around peak hours and rates, as a means of reducing energy costs? Business plans are the business of businesses, and should include every viable option the business has to improve its bottom line on its own—but how many business plans include energy cost savings measures?

Aside: good energy efficiency legislation like the "Energy Efficiency Resource Standard ("EERS") is always under attack because some wrongly perceive that efficiency will cost businesses a few bucks. Again, this short-term thinking must be discarded in light of the well-established, far greater, long-term returns. Likewise, irrespective of the great good it does to address climate change, the "Regional Greenhouse Gas Initiative" ("RGGI") provides great energy and cost *savings*, through energy efficiency, which more than pay for the initial outlays. For example, New Hampshire's slightly more than $9 million 2013 investment in RGGI is alone expected to save 281,313 MWH of electricity over the life of the efficiency improvements made with the money, with an almost tenfold return, *i.e.*, approximately $83 million, in energy savings (see page 24 in link). Recently, there was talk by some state legislators of eliminating RGGI in lieu of a comprehensive carbon pricing program at the state, regional and/or national level. As RGGI only curtails carbon emissions from electric generation—a large part, but still only a part, of the emissions needing to be reduced —we definitely need a complete carbon pricing program at some level, as urged by the Petition. But RGGI could and should be easily incorporated into a complete, comprehensive carbon pricing program covering all carbon emissions, as an exception or carve-out to its otherwise coverage of the same electric generation emissions, if there is concern with duplicative coverage.

4. Businesses are not going to turn any energy savings into more employment, anyway. We know this, we have seen it time and again: businesses turn savings into distributed profits; when they need workers, they outsource to cheaper employment. Unless and until business incentives are expressly conditioned on job creation—and I have seen no New Hampshire plan to require this as the *quid pro quo* for energy savings—there will be no real link between the two to discuss;
5. The push for gas pipeline projects is not even about energy savings. It is all about project-owner profits. There is a "gas rush" going on, with gas companies scurrying to be the first to get their pipelines to our northeast shores for export to more lucrative foreign markets—*and it will only increase our energy costs by foreign competition*. *See* Senator Markey's comments on pipeline exports. The NED pipeline would have cut through more than 70 miles of New Hampshire, compromising the safety, health and rights of everyone in its path—for which New Hampshire would have received a grand net total new gas infusion of *less than 5% of the pipeline's capacity*. Roughly half or more of the gas was clearly marked for export, as must be the destination for the bulk of the gas in all of the other Northeast pipeline projects in the works, since the region plainly does not need all of those new pipelines, by anyone's argument. Of course citizens in the path of pipelines are vehemently objecting to them: they are not supposed to be approved unless there is a public need for them—American, not foreign public—that is the *quid pro quo* for Americans to give up so much for them; but public American *need* has been completely replaced by private *desire* for foreign profit.

It is all so obvious: hopefully the OSI gets it. More large gas projects are both unnecessary and counter-productive to lowering energy costs—study, analysis, research all tell us this. Indeed, "contrary to conventional wisdom, New Hampshire residents and businesses actually pay the same or less for energy as other areas of the country," but our overdependence on gas will likely be a key factor resulting in higher gas prices. Besides, it is foolhardy to paint us into a corner relying on another large gas infusion into New Hampshire: as ISO-NE CEO Gordon van Welie recently noted, "We've got as much pipe as we're ever going to see in New England …"

The arguments that (1) New Hampshire will lose good businesses and jobs by transitioning to green energy, (2) citizens do not want to take that risk, and that (3) we are "giving too much already" to address climate change, do not cut it. With regard to the first: again, *responsible* 21st century businesses—the kind we want to attract—want green energy. As for the others which pillage, pollute and poison, to paraphrase Dorothy of Kansas and Oz: we don't want those apples, anyway. Moreover, if there is a bit of an extra short-term cost in committing to it, businesses will still be happy to come to New Hampshire as they look at the whole package, and New Hampshire is clearly business-friendly. As pages 5-6 of our Amazon HQ2 proposal point out:

> "New Hampshire's principal advantages over the rest of the country have consistently given it an upper hand in attracting businesses, families, and investments. Whether you are looking at our superior tax structure, streamlined regulatory environment, or access and transparency in government, New Hampshire's fundamental enterprise benefits are superior to any competition. …
>
> New Hampshire has maintained the most advantageous tax environment in America for over 200 years …
>
> New Hampshire is consistently ranked as one of the best overall states to live in. Our quality of life has become the gold standard to which others aspire …"

As State Senator Jeb Bradley recently noted:

> "New Hampshire has the 7th best business tax climate in the nation …
>
> New Hampshire's unemployment rate is 4th best in the nation …
>
> Our job growth is among the nation's best …
>
> Our median household income is the nation's best and New Hampshire residents living in poverty is the nation's lowest …
>
> [I]n 2019, the tax on electricity paid by every resident — will disappear! …
>
> For good reason, New Hampshire is recognized by U.S. News & World Report as the second most livable state in the nation using metrics involving health care, education, crime, infrastructure, opportunity, economy and government …"

Our representatives need to start hammering these points home in responding to business complaints about energy prices: start telling them, as responsible leaders should, what they need to hear, not what they want to hear: "Buck up, Buttercup!: if you have to give up one night out a month at the

movies with popcorn and a drink and "settle" for the same things at home to help the rest of us save some shred of a livable world for **your** children and grandchildren, you will still be just fine." As for the arguments that New Hampshire citizens do not want to risk losing business opportunities by "going green": again, most want more climate action, including from corporations and industry. Finally, in response to the argument that we are doing more than our fair share already to address climate change: "If everyone in the world lived the way people do in the U.S., it would take five Earths to provide enough resources for everyone.", and research has determined that "the US alone is responsible for a global temperature increase of 0.15 degrees Celsius, a change that amounts to 20 percent of observable global warming.". If not as a matter of equity, consider it as protecting our own interests; look around the world: we should want to do more as we generally have much more to lose.

In marches, petitions, public hearings and halls, the opposition to fossil fuels is loud, growing, and not about to die, as too many—and more everyday—understand the finality of failure, ensuring continuing heartbreak for those supporting fossil fuel projects. It is time to heed the lessons of such impassioned movements of the past: the public—no, the entire *planet* has made the call on the fossil fuel industry; it is over; giddyup and move on ... The exploding green power industry, on the other hand, presents an enormous opportunity for long-term economic growth and jobs —"[t]he solar industry is adding workers at a rate nearly 20 times faster than the overall economy." We need to start feasting on that buffet before all the goodies are gone.

It is never easy balancing all concerns in governing, and probably has rarely been more difficult than these divisive times. But, we all know that, if our nation is to survive, we will have to come together. Where and when better than on a clear consensus of common concern in our darkest hour?—just as we have always come together. Business *wants* lower energy costs; that is understandable. We all do. But we all *need* this planet more than any amount of money, and it would be good if the miniscule percentage of our population that are our business leaders stopped telling us that they cannot "survive" without killing everyone, started asking what they, too, can do to help save the world—and if those behind our energy policies and decision-making pushed the notion. We no longer have the luxury of directing a little bit here and a little bit there to climate action: we have to pour everything we have into the battle—energy efficiency, demand response measures, renewables, stopping gas expansion, comprehensive carbon pricing, *etc*., *etc*.—and joining the U.S. Climate Alliance while maintaining our state membership in the Under2Coalition to make sure that we adhere to good, concrete climate goals. American business leaders did not respond to all of the shortages and other demands of World War II with complaints of unfairness—they got right to work with all good citizens to figure it out.[12] We are in no less of a crisis right now, and it demands the same "can do" attitude from our business leaders as it does our leaders on all fronts:

"Make it do or do without"—"Don't you know there is a war on"?

[12] "I need not repeat the figures. The facts speak for themselves … These men could not have been armed and equipped as they are had it not been for the miracle of production here at home. The production which has flowed from the country to all the battlefronts of the world has been due to the efforts of American business, American labor, and American farmers, working together as a patriotic team."

--President Franklin D. Roosevelt, Navy Day speech. October 27, 1944

Sincerely,

//s//Richard M. Husband

EXHIBIT “A”

Calling for a Great State Energy Strategy for New Hampshire

This petition is sponsored by Citizens' Climate Lobby, ECHO Action, 350NH, and Toxics Action Center.

We, the signatories to this petition, urge that the New Hampshire 10-Year State Energy Strategy pursue a clean, healthy, economical energy future least impacted by climate change through:

• The robust promotion of energy efficiency programs, policies and measures to reduce health-impairing pollution and lower energy costs

• Emphasizing the development of renewable energy resources, especially solar and wind, that do not accelerate climate change by greenhouse gas (carbon) emissions, but will create jobs and establish a strong New Hampshire foothold in the emerging green energy economy

• The immediate curtailment of state reliance on fossil fuels (oil, coal and natural gas) that cause pollution, accelerate climate change and expose utility ratepayers to inflated rates by overdependence on such fuels

• Adherence to the Carbon Coalition's Climate Change Resolution passed by more than 2/3 of New Hampshire towns in 2007, which calls upon the federal government to address climate change and develop research initiatives to create responsive innovative energy technologies

• Continued state membership in the Under2Coalition, which commits to reducing greenhouse gas emissions to near net-zero by 2050

• Adding New Hampshire to the U.S. Climate Alliance, which commits states to meeting the U.S. goals of the Paris Agreement on climate change

• Committing to 100% renewable energy use by 2050

• Presenting young job-seekers and businesses with a vision for the future that is fresh, welcoming of innovation, cutting-edge technologies and public transportation systems, building economically strong, healthy, safe communities, while protecting New Hampshire's natural resources and scenic beauty

In furtherance of the above, we specifically call for:

• New Hampshire to request an offshore wind task force from the Bureau of Ocean Energy Management to bring offshore wind to New Hampshire

• Prioritization of electric vehicle use and measures to facilitate the same such that the state encourages citizens to join in this critical, emerging transportation revolution and does not lose tourism dollars to states providing for easier electric vehicle use

• A declaration that the Public Utilities Commission should consider further natural gas use and infrastructure expansion to be against the public interest and contrary to the official New Hampshire Energy Policy codified under RSA 378:37, as such use and expansion runs counter to the statutory directive to diversify our energy resources, presents health and safety risks and damages our environment

• New Hampshire to support carbon pricing at the state, regional and/or national level as carbon pricing will reduce pollution and greenhouse gas emissions, prevent health problems and premature deaths and, if collected fees are distributed to consumers, substantially stimulate our economy

Please find attached comments on the State Energy Strategy update on behalf of Granite State Hydropower Association.

Sincerely,
Madeleine Mineau

GRANITE STATE HYDROPOWER ASSOCIATION, INC.

TWO COMMERCIAL STREET
BOSCAWEN, NEW HAMPSHIRE 03303

TELEPHONE: 603-753-4577
EMAIL: gsha@essexhydro.com
WEBSITE: www.granitestatehydro.org

November 2, 2017

Office of Strategic Initiatives
107 Pleasant St.
Concord, NH 03301

To whom it may concern,

On behalf of Granite State Hydropower Association (GSHA), I submit the following comments for your consideration for the update of the state 10-year Energy Strategy.

First, we offer a brief introduction to our organization, the Granite State Hydropower Association (GSHA). GSHA is a voluntary, non-profit trade association for the small-scale, independent hydropower industry in New Hampshire. Members of GSHA own, operate and manage more than 55 hydroelectric facilities located in 40 towns and cities throughout the state, with approximately 50 megawatts (MWs) of distributed generating capacity. GSHA members are part of New Hampshire's small business community, with facilities that are 5 MWs or less and typically below 1 MW in size.

Hydroelectricity is an emissions-free, renewable, reliable and locally distributed source of electricity that provides important economic, recreational, and environmental benefits to New Hampshire. GSHA hydro facilities pay local and state property and business taxes, employ New Hampshire residents, and purchase local goods and services needed for operation and maintenance.

Important points to carry forward or strengthen from the 2014 State Energy Strategy:

- Strengthen and stabilize the RPS
  GSHA strongly supports strengthening and stabilizing the NH RPS.
- Encourage distributed generation
- Sub-recommendation 12b: Continue to expand net metering opportunities.
  We would specifically recommend increasing the per-project maximum allowable capacity from 1MW to 5MW and eliminating requirements for participants to be default utility customers.

Important omissions in the 2014 State Energy Strategy to include in this update

- Section 5.2 on Utility Scale Renewable Energy makes no mention of existing hydroelectric generation or future potential for expanded hydroelectric generation. Several of our members have recently completed projects or are currently working on projects to re-power hydroelectric generation at existing dams. I'm including an article titled "The original renewable" from Valley News on a 1.35MW hydroelectric project on the Sugar River in Claremont that was put back into service this past summer after it was offline for 6 years.

  The State Energy Strategy should advocate for diversified renewable energy generation, including small-scale local hydropower. A diversified mix of renewable energy generation sources will allow generation patterns from the different sources to complement each other and thus provide more reliable energy supply.

We disagree with the statement on page 4 that "The technical and market potentials for in-state hydroelectric power are small in comparison to other resources". We urge you to reconsider the potential for hydropower in our state.

- We urge you to include a recommendation to develop legislative and/or policy solutions to more easily sell renewable energy generated in-state directly to consumers. This would be very beneficial to ratepayers, especially large electricity consumers like manufacturing businesses or data centers, and benefit existing and encourage investment in new local utility scale renewable energy generation. We need to make it possible and easy to keep local energy local!

GSHA greatly appreciates your time and consideration of these comments and is happy to answer any questions or provide further information. Feel free to contact me at streamnerd@gmail.com or 607-592-6184 if I can assist you with additional information. Thank you very much.

Sincerely,

Madeleine Mineau, Co-President
Granite State Hydropower Association

Company Restores Hydropower Plant on Sugar River in Claremont

By Patrick O'Grady
Valley News Correspondent
Saturday, May 20, 2017

Claremont — On a warm, sunny morning last week, after days of steady rain, water crashes over a concrete dam on the Sugar River and boils in foaming rapids on its way to the Connecticut River.

Next to the dam, along the riverbank off Lafayette Street, Bob King stands on a large steel grate. Beneath him the water is calm as it flows into a concrete bay and through a 25-foot-deep "trash rack" that screens out large debris, to an underwater 10-foot diameter penstock. The penstock will carry the water 750 feet downstream to a hydroelectric plant that King and his partner bought earlier this year. By next month, King hopes to be harnessing some of that raw water power to produce electricity for Green Mountain Power's nearby substation.

Watching the river's fury, King can't help but smile.

"The way it is running today, if we could use all that power, it would be about 4 megawatts. That river is surging. We could not use all that even with both units running."

When the twin turbine hydroelectric plant, bought by Sugar River Power LLC in January, is operating at full capacity, it is capable of generating 1.35 megawatts of power — enough to power 1,300 homes, King said.

When John Webster built the Lower Village Hydro Dam in 1995, King said, he replaced an old dam and bypassed another with the penstock, which created a 40-foot drop, or "head," from the intake to where the water exit's the plant.

"He took the drop of two dams and combined it into one and that is how he got 40 feet of head," King said. "That is pretty darn good for New England. The power produced is proportional to the drop."

King has been captivated by hydropower since childhood and his latest acquisition in Claremont is the fifth small plant he and his partner, Tim Taylor, along with some other partners, own and operate. They also own three in the Keene area, where King lives, and one in western Massachusetts.

"I was bitten by the hydro bug when I was 11 years old in 1972, when I stumbled on an old abandoned plant in Massachusetts," King said. "People were just beginning to talk about the energy crisis. Really smart people were beginning to think about climate change.

"As a kid I thought, wow, small hydro, this is the solution. Right there I just latched on to it." He later went to college at Cornell, where a hydro plant was being rebuilt.

A Few Surprises

The Sugar River plant last operated in 2011. King's company bought it in early January for $850,000, according to the city's assessing records.

The purchase was finalized after the City Council approved a 10-year payment-in-lieu-of-taxes program, which is based on a percentage of gross revenues, not assessed value. In years one through four, the

payment would be 2.5 percent of gross revenues; in years five through eight it would be 3.5 percent; and 5 percent for years nine and 10.

When he requested the payment program, King told the council he has an eight-year power purchase agreement with Green Mountain Power to sell what the plant produces for 8 cents a kilowatt-hour.

"What is great about Sugar River Power is this is locally produced renewable power that is going to benefit our customers," Kristin Carlson, Vice President of Strategic and External Affairs with Green Mountain Power, said Friday. "We are committed to reducing power from carbon and this is an important part of that."

At the plant last week, King, Taylor and a third employee, Sam Payne, were continuing refurbishing work on the facility's mechanical pieces that they started in the dead of winter.

"We actually started in September sort of tinkering with permission for the owner as we worked out terms of the deal." King said. "Then everything started in earnest in January."

In December, King told the City Council that, because it had been offline for six years, the plant was "a real mess" and would require a significant investment of time and money before it was operational.

"We found quite a few surprises," Kings said, comparing it to buying an old house and continuing to find more things that need attention. "We had to go through all sorts of technical challenges."

Added to that was working through the bureaucracy to regain permission from ISO New England Inc., the Hadley, Mass.-based operator of the region's bulk power system and wholesale electricity markets, for the plant to produce power for the grid. When the plant had shutdown, ISO dropped it from its system of energy producers, King said.

"It was a huge nightmare to get it back into the ISO system. You can't go online without the ISO's permission. They control the grid for all of New England."

After finally arranging a meeting to plead their case, and with the help of Eversource, "ISO finally came around," King said.

Eversource spokesman Martin Murray said Friday one of their roles is to help power producers navigate the rule and regulations.

"ISO is really a gatekeeper to ensure reliable transmission of energy throughout New England," Murray said.

"Even small (power producers) are part of the six-state power grid. They need to be aware of any source that will be potentially part of that transmission."

Eversource has nine hydro facilities of its own and buys power from about 30 statewide, Murray said. "We deal a lot with the regulations of ISO."

Power Conversion

When he became serious about buying the plant last summer, King said, the first thing that had to be done was to rebuild one of the 10-foot-square steel gates that slide up to open the penstock.

. _____ PRODUCING ELECTRICITY FROM A RENEWABLE RESOURCE._____

"We couldn't even close it to work on the plant until we completely rebuilt it because it was rusted and had collapsed into the penstock," King said.

At the plant, a 1,500-square-foot building with a peaked roof, King explained how water and turbines combine to produce power.

As the penstock approaches the plant, it splits into two, 6-foot diameter pipes. A large butterfly valve can be adjusted to control the flow of the water as it moves through each pipe. Inside the building, the pipe turns downward at a 45 degree angle and the water passes through a turbine before exiting into the river.

The turbine, which King likened to a ship's propeller, turns a 20-foot-long steel shaft that comes out of the pipe to a coupling connected to a gear box.

"The gears speed up a smaller spinning shaft that actually drives the electric generator (that sits above the shafts), which turns all that torque and power into electricity," King said. "It basically converts mechanical energy into electrical energy."

Reconditioning was gear box and getting it properly aligned has proven to be the toughest and most time-consuming challenge, King said.

"Gear boxes are notoriously finicky and they require precise alignment and they have lubrication systems. The bearings were all shot in that thing, almost everything about it needed to be reworked," King said.

"Aligning the turbine shaft to the gear box shaft took weeks. We actually had to cut parts of that tank away and reweld it. Everything was so far out of alignment. You are shooting for alignment within a 5,000th of an inch. We found some things that were an inch out, just way off."

The shaft on the second turbine generator, closest to the river, was spinning — but not to produce electricity.

"We are just idling it to slowly move sand out of the bottom end. That one (turbine generator) needs to be rebuilt completely even more than this one," King said. "But before we can rebuild it, we have to drop a gate in the back where it exits into the river and then pump it out so we can work on it. We can't even do that until we get the sand out of the exit tunnel."

Powering the Past, And the Future

The technology to harness water power, and how that power is used, has changed dramatically the last 250 years since Benjamin Tyler built Claremont's first water-powered mill on the Sugar River in the 1760s in the area of the former Coy Paper property on Plains Road.

But what Tyler did then, and what Sugar River Power is doing today, has not changed — figuring out the most efficient way to turn rushing water into power, whether to run saw mills and grist mills or electric lights and computers.

Water power fueled Claremont's expansive growth from the mid-1800s into the 20th century. Most of that growth was in a three-quarter mile stretch of river through the heart of the downtown, but included mills in West Claremont as well. Valuable dam privileges along the river created well-known companies including Sullivan Machine and Monadnock Mills, making Claremont one of the state's premier

manufacturing towns. Additionally, Tyler's grandson, John Tyler, patented a highly sought-after turbine water wheel in 1850s that was sold to mills around the country.

Today, in New Hampshire, there are more than 60 hydroelectric facilities located in 18 towns and cities throughout the state, totaling around 50 megawatts, according to the Granite State Hydropower Association's website. Those projects generate around 50 megawatts each year, enough to power about 35,000 homes. In Claremont there are two other small hydro plants on the Sugar River: one off Factory Street and the other along Plains Road.

King said the Claremont plant attracted his attention for two reasons: "I have always loved Claremont, from the first time I drove through here," he said. "Beyond that, I know John Webster, a colleague."

In addition to his engineering knowledge, King has also had to be a savvy businessman. He estimates that the investment so far is in the "hundreds of thousands" of dollars, so he's eager to save money at every opportunity.

"There is no way you could do this whole thing economically if you went out and hired an engineer and bought everything new. Can't do it. You have to be very careful with your expenditures."

For example, when the shaft on one of the turbines had to be replaced, it became a creative do-it-yourself project. "There is so much force on (the gear box), if it bends it is tough on all the bearings inside," King said. "So we took the old shaft, chopped it in half and we are making giant pusher struts to hold that gear box. It will keep the gear box from flexing. ... Again, buying something like that new, forget it."

It's Automatic

Another example of cost-saving is a sensor that will help automate the plant.

Under the previous ownership, King said everything was manual, requiring an operator to look at the river and decide how much power it could deliver. Now, he said, "We are automating the whole thing."

The key to that is a sensor that grabs "every hunk of data in the plant." King pointed to the small white box near the turbine. "So this guy, I just mounted yesterday. That measures how much the hydraulic cylinder opens and thereby how much the gates are open and thereby how much water you are using, and that feeds back to the computer.

"As is our style, that sensor, a $500 item, I got on eBay for $100."

King has also spent a lot of time in a small room overlooking the turbine generators working on computer-related equipment that had to be improved to meet utility requirements.

"I spent months rebuilding all of this to bring it up to modern standards," King said. "All this stuff is ... electrical protection. It shuts off the generators for electrical inconsistencies, like high and low voltage, high and low frequencies," King said. "That is not the automation, that is the just protection the utility requires."

In the same room is large industrial computer that was previously in use at a hydro plant in New York. King's company had sold the plant and the new owners wanted to upgrade everything.

"They tore all this perfectly good stuff out and they gave it to us," King said. " 'We don't want it, you guys want it?' "

The computer sat in King's basement until the Claremont plant was bought.

King is also installing software that will control everything about the plant through a computer. "And the really cool part is, through that modem and an old-fashioned landline, we can call the plant and control it and monitor it. And furthermore, it sends out text messages on any plant problems," he said.

"Mostly it will be self-contained and the computer will run it. But we can monitor it, we can override the computer remotely, plus we will have a couple of local guys making daily visits. Once the thing is running, presumably we won't be spending much time here."

King's enthusiasm for creating renewable power is apparent. "I love water," he said while watching it crash over the dam. "It is clean. It is the original renewable. A great resource."

Sam Payne, who was working with Taylor cutting away at the old shaft to create struts for gear box, was previously a circus acrobat, King said.

"He got too old for that and he has always had an interest in hydro. People get bitten by it and is hard to shake it."

The business brings daily challenges that are always different.

"Having text messages coming from your automated plants, plant goes down at 2 in the morning, you are up and you are dealing with it," King said. "We are always dancing around these five plants doing maintenance, capital improvements and so forth."

Patrick O'Grady can be reached at pogclmt@gmail.com.

PRODUCING ELECTRICITY FROM A RENEWABLE RESOURCE.

I am writing to comment on the 2017 NH Energy Strategy.

Our State Energy Strategy currently calls for strong energy efficiency programs, more clean energy, and electric vehicles and I believe it that would be better left alone. If any revising is done, the revised strategy must continue to focus on energy efficiency and renewable energy, including more solar and offshore wind, and phasing out fossil fuels, including no further importing of natural gas especially any natural gas that comes from fracked sources. It must also include rigorous but achievable greenhouse gas emissions reduction goals in line with the 80% less by 2050 objective in the New Hampshire Climate Action Plan.

Sincerely,
April Walker
Greenville, NH 03048

6 November 2017
TO: NH Office of Strategic Initiatives (OSI) via email to osiinfo@osi.nh.gov
FROM: Kate Hartnett, Deerfield and Berlin NH (nhkate98@gmail.com)

RE: Comments to NH OSI on proposed 2014 Energy Strategy Update
Thank you for the opportunity to provide input to the proposed update. I write from my perspective of working in a variety of ways on energy issues since the 1970's. I currently serve as Vice Chair of the Deerfield Planning Board, which created the Energy Chapter in our Master Plan in 2012. My specific comments on this matter follow.

BACKGROUND: From the realities outlined in the 2016 book *The Grid* (G. Bakke), to innovation in many places, including New York, and most states in New England, the approach to energy strategies likely will play a significant role in economic success or failure. OSI has the opportunity to help New Hampshire succeed.

SUMMARY: The track record objectively shows that the most cost effective energy strategy is to reduce the need for supplies through efficiency and conservation, and meet more of the remaining demand through energy storage and renewable supplies. Innovation to become smaller, more flexible, quicker, adaptive, and increasingly locally sourced will lift New Hampshire; business as usual will sink us, or at least cause us to fall behind others.

SPECIFIC COMMENTS: New Hampshire has a long tradition of successful work on energy innovation. To continue that trend, please:

- Build on the existing 2014 Strategy, while making the improvements called for.
- Continue to support proven initiatives such as Regional Greenhouse Gas Initiative (RGGI), Renewable Portfolio Standard (RPS), Renewable Energy Credits (RECs), Net Metering, etc.
- Adopt the 2015 building codes, as is.
- Ensure that all new construction and major renovations are EnergyStar certified, if not more.
- For best results, provide incentives for building inspectors and code enforcement officers to become expert with that 2015 code and EnergyStar programs.
- Take a look at what New York State and Vermont are doing to recognize 21st century realities and position their states for a more resilient economy and building stock. Pick some programs that could help New Hampshire join that path.

AN OCTOBER STORM EXAMPLE: I write these comments on Monday 6 November 2017 because the disruption from the 29-30 October rain and wind storm caused extensive road closures and power losses that lasted over a week for some. Had the weather been colder, many would have had to leave their homes for shelters. Homes built for energy efficiency would be more resilient, allowing more people to stay in the safety of their homes. And more energy efficient workplaces would be sooner available to return to. More distributed generation and storage would have reduced outage extent and time. All better for the economy, as well as peoples' safety, comfort, and productivity. This is the new reality we should be preparing for.

Thank you again for your time and consideration.

Dear Jared,

Attached please find the Business and Industry Association's letter regarding revisions to the state's 2014 10-Year State Energy Strategy. A hard copy was sent to you on Friday, November 3rd. You should be receiving it in the mail today.

Thank you.

Shirley Streeter
Business & Industry Association of NH
122 North Main Street
Concord, NH 03301
Tel: 603-224-5388 x 104

BIA
Business and Industry Association
New Hampshire's Statewide Chamber of Commerce

Promoting a healthy climate for job creation and a strong New Hampshire economy.

Business and Industry Association
New Hampshire's Statewide Chamber of Commerce

122 North Main Street, Concord, NH 03301
Tel: 603.224.5388 • Fax: 603.224.2872 • Web: www.BIAofNH.com

November 3, 2017

Jared Chicoine, Director
Office of Strategic Initiatives
107 Pleasant Street
Concord, New Hampshire 03301

Dear Jared:

It was recently brought to my attention that the Office of Strategic Initiatives (OSI) has requested public comment on potential updates to the state's 2014 10-Year State Energy Strategy. This is an extremely important undertaking to New Hampshire's business community, especially the manufacturing sector which drives the state's economy and is so heavily dependent on electrical energy and natural gas.

The Business and Industry Association (BIA) – New Hampshire's statewide chamber of commerce and leading business advocate – recognizes the need for balanced energy solutions, including energy conservation and renewables, to address New Hampshire's energy challenges. However, we can't ignore the well-established need for additional electric transmission and natural gas pipeline infrastructure. While neither the BIA nor its *EnergizeNH* campaign, initiated in 2015, have established positions for or against specific energy projects, both are working to raise awareness about the urgent need for energy solutions, including natural gas and electric transmission infrastructure. The focus of the state's current 10-Year State Energy Strategy is on renewable energy and conservation. Frankly, renewables and conservation alone cannot resolve the state's urgent energy challenges.

It is well-established that New Hampshire and New England are well behind the curve for energy infrastructure development. Our high energy and electricity bills partially reflect this fact. This will continue to be a grave challenge for businesses in New Hampshire and the region until key energy infrastructure expansion projects are approved and constructed, which will take years. This is compounded by the retirement of non-gas-generating facilities, which will further exacerbate our reliance on natural gas. As a state and a region, there needs to be a focus on encouraging expanded natural gas pipeline capacity and increased electrical transmission into the region.

Electricity prices in New Hampshire and New England are more than 50% higher than prices in the rest of the contiguous United States. The high cost of electricity is not just a New Hampshire challenge, it's a regional challenge. New Hampshire is part of New England's energy grid, which supplies electricity to the entire region. The high price New Englanders pay for electricity is a matter of supply and demand on a regional scale. Energy costs are driven higher by constrained supply into the grid.

We are particularly concerned about New Hampshire manufacturers like New Hampshire Ball Bearings, BAE Systems, Lindt & Sprungli, Sig Sauer, Whelen Engineering, EMD Millipore, Markem-Imaje, Monadnock Paper Mills, Keeney Manufacturing, and dozens of others who drive New Hampshire's economy in a way no other sector does—number of jobs, wages, exports, contributions to Gross State Product, and more. These companies, providing employment for 69,000 people throughout the state, are most sensitive to the cost of electrical energy. Up to now, BIA worried about lost job growth and economic activity as advanced manufacturers like these, and other large energy users, expanded operations elsewhere. Given current energy prices, we now face a bleaker scenario: manufacturers and other large energy consumers moving existing jobs in New Hampshire to lower-cost places around the country or world.

On behalf of BIA's members, particularly manufacturers and other large energy users, I respectfully urge you and your OSI colleagues to emphasize the critical need for expanded natural gas pipeline capacity and increased electrical transmission into the region as you update New Hampshire's 10-Year State Energy Strategy.

Best Regards,

Jim Roche
President

C: Governor Sununu
Senate President Chuck Morse
Senator Avard, Chairman, Senate Energy & Natural Resources Committee
Senator Bradley
Senator Woodburn
Speaker Shawn Jasper
Representative Barry, Chairman, House Science, Technology & Energy Committee
Representative Shurtleff
PUC Commissioner Martin Honigberg
PUC Commissioner Kathryn Bailey
PUC Commissioner Michael Giaimo

Dear Mr. Chicoine,

Please find attached the written comments of New Hampshire Legal Assistance regarding potential updates to the State's Ten Year Energy Strategy. We appreciate the opportunity to submit written comments at this time.

Please do not hesitate to contact me should you have any questions or concerns.

Sincerely,

Raymond Burke
Law Graduate
Admitted to practice in New York and Massachusetts
Not admitted to practice in New Hampshire
New Hampshire Legal Assistance
117 North State Street
Concord, NH 03301
T: (603) 206-2214
F: (603) 223-9194
www.nhla.org

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www.nhla.org

NEW HAMPSHIRE LEGAL ASSISTANCE

Working for Equal Justice Since 1971

Claremont Office
24 Opera House Square
Suite 206
Claremont, NH 03743
603-542-8795
1-800-562-3994
Fax: 603-542-3826

Concord Office
117 North State Street
Concord, NH 03301
603-223-9750
1-800-921-1115
Fax: 603-223-9794

Manchester Office
1850 Elm Street
Suite 7
Manchester, NH 03104
603-668-2900
1-800-562-3174
Fax: 603-935-7109

Portsmouth Office
154 High Street
Portsmouth, NH 03801
603-431-7411
1-800-334-3135
Fax: 603-431-8025

Berlin Office
1131 Main Street
Berlin, NH 03570
603-752-1102
1-800-698-8969
Fax: 603-752-2248

Administration
117 North State Street
Concord, NH 03301
603-224-4107
Fax: 603-224-2053

TTY: 1-800-735-2964

November 6, 2017

Jared Chicoine, Director
Office of Strategic Initiatives
Johnson Hall
107 Pleasant Street, 3rd Floor
Concord, NH 03301

Re: Public Comments on Potential Updates to the New Hampshire 2014 Ten Year Energy Strategy

Dear Mr. Chicoine:

We are submitting the following public comments on behalf of New Hampshire Legal Assistance (NHLA) and its low-income clients regarding potential updates by the Office of Strategic Initiatives (OSI) to the State's 2014 Ten Year Energy Strategy.

New Hampshire Legal Assistance provides free legal services to seniors and low-income households. NHLA's services include representation of our clients at the legislature and the New Hampshire Public Utilities Commission (PUC) regarding electric, gas, and telecommunications. Issues before the PUC currently include energy efficiency, renewable energy, rates, rate design, bill assistance programs, and customer service rules and policies.

Our comments focus on the impact of the state energy strategy on seniors and low-income households.

I. Financing and Funding of Energy Efficiency Programs.

1. Low-income families lack the discretionary income needed to invest in energy efficiency. See State Energy Strategy, page 29.

1) Even a low or a zero percent interest loan is unlikely to be affordable to low-income families who already struggle with competing debts and necessary living expenses which they must try to prioritize with their limited incomes. See State Energy Strategy, page 29.

2) Any financing proposal would also require close scrutiny to assure necessary consumer protections and to prevent exploitation of seniors and low-income households.

2. It is necessary to maintain and increase public funding for low-income programs.

1) According to the 2014 State Energy Strategy at least 80,000 low-income dwellings are in need of weatherization and other energy efficiency services, yet the current program serves just 1,000 low-income dwellings each year. See 2014 State Energy Strategy, page 35.

2) If private funding becomes available for energy efficiency, consideration should be given to shifting System Benefits Charge (SBC) funds from non-low-income energy efficiency programs to the low-income program. As noted on page 34 of the State Energy Strategy, attracting private financing to work with public funds will expand the reach of limited public funds.

3. Consideration should be given to increasing SBC funding for the low-income energy efficiency program.

1) Additional funding is needed for the low-income program. It would not violate the restructuring principle of equity and fairness in RSA 374-F:3, VI to increase funding for the low-income program due to the recognized need for weatherization and energy efficiency services in low-income households, and the inability of these families to address this need.

4. Consideration should be given to an increase in Regional Greenhouse Gas Initiative (RGGI) funds for the low-income energy efficiency program.

1) The legislature should increase the amount of RGGI funding for the low-income program. There are long waiting lists for the low-income weatherization and energy efficiency programs. Directing more RGGI funding to the low-income energy efficiency program would provide necessary weatherization services to low-income customers. The current requirement to refund most of the RGGI funds to all ratepayers provides a savings of only about $0.20 per month to the average residential customer in contrast to the significant benefits provided by energy efficiency according to the testimony of the New Hampshire Department of Environmental Services on September 28, 2017 to a subcommittee of the House Science, Technology, and Energy Committee regarding HB 559 (2017).

5. The legislature should consider removing or increasing the statutory cap on SBC funds for the state low-income Electric Assistance Program (EAP).

1) RSA 374-F:4, VIII(c) limits SBC funding to 1.5 mills per kWh for the low-income EAP bill assistance program. An increase in the EAP discount levels would enable low-income EAP customers to better afford their monthly electric

bills. This would supplement the savings provided to low-income customers who are chosen from long waiting lists to participate in the state energy efficiency and weatherization programs.

II. Improving the NH Cost Effectiveness Test for Evaluation, Measurement, and Verification of the PUC Statewide Energy Efficiency Programs.

1. Non-energy impacts, benefits and cost-effectiveness adders should be included in the test.

1) The PUC uses a cost-benefit test to determine and monitor the cost-effectiveness of the statewide energy efficiency programs. See State Energy Strategy, page 23.

2) Other states include in their cost-effectiveness tests "non-energy impacts" (NEIs) and/or non-energy "adders." The purpose of doing so is to enable program managers to account for hard to quantify, but acknowledged, non-energy benefits, which result from energy efficiency programs.

3) New Hampshire should also include these non-energy benefits in its cost effectiveness test for the statewide energy efficiency programs.

4) The PUC should include the use of portfolio-wide NEI adders for determining program cost effectiveness.

5) The PUC should also include a separate low-income NEI adder for the low-income program in recognition of the additional acknowledged, but hard to quantify benefits which result from low-income energy efficiency programs.

III. Rate Design Changes.

1. Certain recommended rate design changes, such as decoupling, have potential downsides which should be recognized by NH policy makers.

1) Utilities and various stakeholders argue that it is necessary to adopt decoupling and other rate adjustment mechanisms to encourage utilities to aggressively promote and implement energy efficiency programs. See State Energy Strategy, pages 26 and 33. However, recognition should be given to the potential downsides of adopting decoupling and other automatic rate adjustment mechanisms sought by utilities.

2) Close examination of decoupling proposals reveals that there are risks involved. Risks include the potential for additional automatic annual rate

increases which may result from adopting rate adjustment mechanisms such as decoupling. These rate adjustment mechanisms have the potential for shifting risk from stockholders to customers as the utility seeks recovery of costs it believes it should be allowed to recover as a condition of having energy efficiency programs. The Commission recognized this risk in its 2007-09 investigation into energy efficiency rate mechanisms in Docket No. DE 07-064. See Order No. 24,934 dated January 16, 2009, at pages 20-23.

IV. The Smart Grid Could Pose Potential Risks for Low-Income Customers Who Are in Arrears and Who Have Difficulty Paying Their Bills.

1. Protections are needed for customers if the Smart Grid becomes a reality in NH.

1) Many endorse having a "Smart Grid" in NH. A Smart Grid can potentially improve communication between utilities and their customers and help with real-time management of electrical usage, with the potential for reduced bills through time-of-use rates and reduction of peak demand. See State Energy Strategy, page 17. At the same time, there is recognition of the need for adoption of certain consumer protections as part of the development and implementation of the Smart Grid in NH. One such protection is maintaining customer privacy. See State Energy Strategy, page 21, Section 3.4.

2) Another necessary consumer protection is to prohibit utilities from using their Smart Grid as a bill collection device. This is especially important for low-income customers. Low-income customers often have difficulty paying their bills and consequently may accrue arrears. The utility should not be allowed to threaten to disconnect or reduce service by remote load control devices as a means of collecting bills. Such use of the Smart Grid would be a circumvention of the due process protections that have been put in place by the legislature and the PUC through the PUC Customer Services Rules (PUC Chapter 1200) and RSA 363-B, with respect to termination of a customer's service.

New Hampshire Legal Assistance appreciates the opportunity to submit these comments.

Respectfully submitted,

Raymond Burke, Esquire
Alan Linder, Esquire

E-mail: rburke@nhla.org

Dear OSI,

I'm very concerned about the process that is being followed for commenting on the 10 Year State Energy Strategy.
I find it unacceptable that you gave limited notice on the hearings and that they were not very centrally located and were poorly advertised. What's even worse is that I am unable to read any of the comments as they come in and so am unable to respond to other peoples good or bad ideas.
If you'll notice, during the 2014 Strategy comment period, the comments were published and appeared contemporaneously.
New Hampshire and the world, need to make a wartime push to combat climate change. We need all the best ideas and problems discussed openly. We need all hands on deck.
Please read this article to understand how desperately we need our next State Energy Strategy to be focused on 100% renewable electricity by 2030 and 100% renewable total power by 2050.
Here's How Far the World Is From Meeting Its Climate Goals

Here's How Far the World Is From Meeting Its Climate Goals

By Brad Plumer

Two years after countries signed a landmark climate agreement in Paris, the world remains far off course from pr...

Furthermore, NH needs to take the rules regarding RGGI participation out of the hands of our legislators. They should be able to vote on whether or not to participate, but allowing them to constantly adjust how much funding goes to which programs is better left to the PUC. This has been amply demonstrated in that 4 of our 6 NE neighboring states that have RGGI overseen by the PUC or DPU have scored amazing successes and are in the top 10 nationally for Energy Efficiency. NH and Maine, who let the legislature play political football with these programs rank #13 for Maine and a discouraging #21 for New Hampshire.
Energy Efficiency should be a conservative value.
Thank you for taking my comment.
Sincerely,
Patricia A Martin
Rindge, NH 03461

Jared Chicoine
Director, NH Office of Strategic Initiatives
Governor Hugh J. Gallen State Office Park
Johnson Hall, 3rd Floor
107 Pleasant Street
Concord, NH 03301

November 6, 2017

Dear Mr. Chicoine,

As organizations devoted to convening New Hampshire businesses committed to advancing clean energy and energy efficiency in the Granite State, New Hampshire Businesses for Social Responsibility (NHBSR) and Ceres are pleased to submit the following statement of shared principles signed by New Hampshire businesses. The statement, entitled "Investments in Clean Energy Help New Hampshire Businesses Thrive," outlines business support for transitioning to a clean energy economy to improve our competitiveness, and our state's prosperity, health, and security.

These principles represent the views of a large portion of New Hampshire's business community, and we are pleased to submit them as written testimony to the State's 10-year Energy Strategy updates.

Sincerely,

Michelle Veasey
Executive Director
NH Businesses for Social Responsibility (NHBSR)

Alli Gold Roberts
Senior Manager, State Policy
Ceres

Investments in Clean Energy Help New Hampshire Businesses Thrive

As businesses and employers invested in New Hampshire, we believe that transitioning to a clean energy economy will improve our own competitiveness, and our state's prosperity, health, and security.

- Energy efficiency and clean energy solutions are essential to our businesses. Strengthening investments in market-driven clean energy programs will help New Hampshire businesses be more competitive and grow our workforce.
- Clean energy solutions help us protect the beautiful natural resources of our state, our tourism economy, our health and our way of life.
- Strong state policies to enhance access to energy efficiency and renewable energy will shift our economy away from imported fossil fuels, reduce energy costs and support locally produced clean energy resources—keeping our energy dollars in New Hampshire's economy.
- Investments in energy efficiency and renewable energy make us more resilient by reducing exposure to fossil fuel price volatility.
- Developing clean energy systems and technologies to meet the needs of a changing global economy provides economic opportunities for the businesses and people of our state.

We support policies and legislation that will advance these points and attract innovation and opportunity for our state and our people.

Sincerely,

900 Degrees Pizzeria
Admix
Alnoba
Bruss Project Management
Co-op Food Stores
Filtrine
FoodState
Gale River Motel
GDS Associates Inc.
Global Round Table Leadership
Grappone Automotive
Gravity Group New England
Great Bay Community College
Green Alliance
Green Energy Options
Hannaford Supermarkets
KW Metropolitan
MicroSpec Corporation
NESG
New England Commercial Solar Services
Pause, a Mindfulness Practice
Pax World Funds
Pete and Gerry's
ReVision Energy
Stephenson Strategic Communications
Stonyfield Farm
Timberland
Wire Belt Company of America
W.S. Badger and Co.
Worthen Industries
Yes! Ventures

Good afternoon,

I simply wanted to comment that I hope time of day pricing is a central part of the 10 Year State Energy Strategy. I know that a pilot is underway, but this sort of variable pricing has been done for years in a variety of ways in other states. This is a market-based solution that can lead to greater consumer awareness, smooth out demand on our infrastructure and lead to reduced costs for all parties involved. Thank you for your work on this.

Kevin Porter

Director Chicoine,

Please find the attached comments from the New England Ratepayers Association regarding revisions to the New Hampshire State Energy Strategy. Please do not hesitate to contact me if you have any questions.

Best regards,

Marc

Marc Brown | President | **New England Ratepayers Association**
Ph: 603-369-4301 | PO Box 542 | Concord, NH 03302 | marc@neratepayers.org

New England Ratepayers Association

October 31, 2017

Jared Chicoine
Director, NH Office of Strategic Initiatives
Johnson Hall, 3rd Floor, 107 Pleasant Street
Concord, NH 03301

Re: Comments on revisions to the New Hampshire State Energy Strategy by Marc Brown, President of the New England Ratepayers Association

Dear Mr. Chicoine:

The New England Ratepayers Association (NERA) wishes to submit the following comments regarding revisions to the New Hampshire State Energy Strategy:

It is all-too-apparent that the status quo of New England's electricity grid is untenable, as ISO-NE has warned many times in recent years. It is time for policy makers to ask a simple question each time they draft legislation that affects the price of electricity: Will this legislation lower the cost of electricity to the businesses and families who pay the bills? The answer to that question should always be yes. Too often New Hampshire and other states in the region have enacted policies whose answer to that question is "no", leaving ratepayers with the current environment of high prices, and a dwindling base load capacity that threatens to drive them even higher. Accordingly, our comments on this matter address various state policies and provide recommendations on how to improve them:

Renewable Portfolio Standards

Implemented in 2008, Renewable Portfolio Standards (RPS) require electricity suppliers to purchase a mandated portion of Renewable Energy Certificates (RECs) from specified classes of renewable energy generating sources. Since its implementation, the New Hampshire RPS has cost ratepayers more than $150 million in additional electricity charges. Over $55 million of those costs are from Alternative Compliance Payments (ACPs)[1], which are paid by electricity suppliers when Renewable Energy Certificates are not available.[2] What have New Hampshire's ratepayers received in exchange for these increased electricity costs? Not much. According to

[1] http://www.puc.state.nh.us/sustainable%20Energy/Renewable_Portfolio_Standard_Program.htm

[2] http://nhpr.org/post/berlin-biomass-plant-fully-operational-what-cost-ratepayers

data available from ISO-NE[3], in 2008 total generation in New England from renewables including hydro was 17,628 Gigawatt-hours (GWhs); in 2016, after nearly a decade of RPS, generation from renewables including hydro totaled 17,696 GWhs. Hundreds of millions of dollars in additional costs to New Hampshire ratepayers, and billions to New England's ratepayers regionally, to achieve a *.39%* increase in renewable energy generation is a poor investment by any measure. The real beneficiaries here are the generators and energy companies that have directly profited from RPS.

Recommendation: Freeze RPS at 2017 levels and combine the four classes of renewables into one. Freezing RPS at current levels will send a signal to the market that New Hampshire will not continue to subsidize intermittent, expensive and unreliable renewable power sources at the expense of lower cost base load power projects. Collapsing the classes will increase competition for RECs among renewable generators and will continue to reduce Alternative Compliance Payments, which are paid by electricity providers when they can't procure the requisite RECs for each of the current four classes of renewables—costs that eventually flow through to ratepayers. These reforms will reduce costs to New Hampshire's ratepayers by tens of millions of dollars annually without impacting renewable energy generation levels.

Regional Greenhouse Gas Initiative (RGGI)

RGGI is a regional compact between the six New England states, New York, Maryland and Delaware that essentially places a tax on carbon emissions from fossil-fuels. To date, RGGI allowances have totaled $2 billion paid by ratepayers via increased energy market costs incurred by fossil-fueled electricity generators in order to comply with RGGI's emissions mandates. Many states have raided RGGI funds, siphoning off more than $150 million from the auction proceeds to fill shortfalls in state budgets. New Hampshire is not immune to such diversions, as when they diverted $3.1 million in 2010[4]. Current New Hampshire statute requires that all proceeds above $1 from each allowance be rebated back to ratepayers. In 2012, RGGI emissions were down to 91 million short tons and the cost of allowance fees were near the floor price of $1.89[5] and appeared stuck there. The increase in natural gas reserves and subsequent low natural gas prices resulting from hydraulic fracturing in places like Pennsylvania's Marcellus Shale has led to displacement of other fossil fuel generation resources by natural gas and its inherently lower emissions. Despite the apparent success in meeting emissions targets due to this shift in fuel mix, the RGGI states decided to change the rules and slash the number of emission credits. This had the impact of artificially increasing the price of RGGI allowances, again making electricity incrementally more expensive for ratepayers. Even after this adjustment, emissions continued to go down and pricing for allowances once again neared the floor price. RGGI states

[3] https://www.iso-ne.com/isoexpress/web/reports/load-and-demand/-/tree/net-ener-peak-load

[4] http://www.newjerseynewsroom.com/nation/cash-strapped-states-like-nj-use-cap-and-trade-revenue-to-fund-budgets

[5] https://www.rggi.org/market/co2_auctions/results/auctions-1-25?id=220

reacted rashly again and agreed to further reduce CO2 emissions by 30% from 2020 to 2030. This will continue the cycle of increasing compliance costs to fossil-fueled generators and those costs will be passed on to New Hampshire's ratepayers.

Recommendation: Rebate all RGGI allowances to ratepayers to mitigate the damage caused by the scheme. RGGI's design binds states to the program by returning participating state's program costs back to that state, making it very difficult for states to make an economically rational decision to exit the program. If New Hampshire unilaterally seceded from RGGI the state would lose its share of the program "revenue" while its ratepayers continued to pay for the cap and trade scheme—as all other states in the regional electricity market participate in RGGI and impose cap and trade costs on their fossil-fueled generators. New Hampshire should continue to advocate for dissolution of the RGGI cap and trade scheme as it raises costs to its ratepayers and continues to fail on its promises of lower emissions, health benefits and economic growth.[6]

Energy Efficiency

In 2016, the PUC issued an order[7] implementing an Energy Efficiency Resource Standard (EERS), which will increase the amount of public financing for energy efficiency programs through increases in the System Benefits Charge (SBC) beginning January 1, 2018. Over the initial three-year program period New Hampshire's ratepayers will pay approximately $100 million in increased electricity rates. Advocates for the EERS argue that energy efficiency investments result in savings for all ratepayers via electricity load reduction and subsequent energy market savings; declines in residential and business electricity consumption; and transmission savings as a result of reducing New Hampshire's peak load and thus reducing its portion of regional transmission costs. These "savings" are based on engineering models and not actual data.

Recommendation: Do not expand the current EERS beyond 2020 unless and until the PUC can quantitatively identify savings to ALL ratepayers using existing, and not modeled, data. If the current high electricity prices aren't enough incentive for businesses (and families) to undertake energy efficiency upgrades on their own, then the state shouldn't shift costs from one group of ratepayers to another to finance these projects when almost all the benefits only flow to the financial beneficiary. Continued public financing of energy efficiency will only undermine the potential and necessary growth of private investment and continue to distort the decision making of market participants.

[6] https://object.cato.org/sites/cato.org/files/pubs/pdf/working-paper-45_1.pdf

[7] http://www.puc.state.nh.us/Regulatory/Docketbk/2015/15-137/ORDERS/15-137_2016-08-02_ORDER_25932.PDF

Net Metering

Net metering is a mechanism that allows for "behind the meter" generators (mainly solar) to receive credits (or in some instances, even payments) for the energy that they generate and supply to the grid. Generous federal and state subsidies in the form of investment and production tax credits, direct rebates on installations, Renewable Energy Certificates (RECs), property tax abatements and payments at retail rates have led to a marked increase in distributed generation throughout New Hampshire and New England. In 2017, the NH PUC issued an order[8] establishing a new net metering tariff which compensates exports from behind-the-meter generators at the full default energy service rate, full transmission and 25% of distribution rates.

As outlined during this tariff docket, the New England Ratepayers continue to believe that a net metering tariff should reflect the value of the electricity generated at the time and location it is generated. There is a clear market mechanism which determines this value through the Locational Marginal Price (LMP). NERA believes there are situations where a direct generation (DG) system can provide substantial benefits, and in those cases a specific DG solution should receive prices over and above the LMP. NERA also believes that almost all other DG systems are not providing any transmission and distribution benefits and it should be incumbent on the generators to quantitatively identify specific transmission and distribution benefits which DG systems provide. Without this type of analysis, any net metering tariff above LMP is cost shifting from non-DG customers to those that can afford to put expensive solar panels or other DG solutions at their premises. This is most egregious given that numerous studies and local data indicates that the majority of solar installations take place in high income areas while relatively few occur in low income areas – exacerbating the cost shift from low income families to the wealthy.

It is also unfortunate that the apparent default position of elected officials and the PUC has been to "assume" transmission and distribution benefits from distributed generation and require studies to then determine if those benefits actually exist, instead of defending te ratepayers first. What should be required at the PUC or in any legislation is that the beneficiary, in this case the distributed generation owners, should bear the burden of proof and not receive the benefits without providing quantitative data identifying the benefits to the ratepayers of New Hampshire.

Recommendation: Net metering should continue to be evaluated to make sure that the costs of transmission and distribution aren't being inequitably transferred from those with distributed generation to those without it. Those who net meter should be compensated for excess generation at the Locational Marginal Price (LMP) which fully values the time and location of the power generated. In addition, PUC policies should be adjusted to place the burden of proof on the beneficiary of a program, and not unilaterally allow benefits prior to quantitative evidence identifying the extent and recipient of the benefits.

[8] http://www.puc.state.nh.us/Regulatory/Docketbk/2016/16-576/ORDERS/16-576_2017-06-23_ORDER_26029.PDF

Natural Gas

One of the most critical issues facing New Hampshire's legislators is removing barriers to the expansion of natural gas pipeline in New Hampshire as well as the rest of New England. Abundant natural gas in the nearby Marcellus Shale has the potential to provide low-cost fuel to the region for years to come. However, New Hampshire should not place all its eggs, especially when it comes to electricity generation, in the natural gas basket. Policy decisions in other states, such as the current ban on fracking in New York State and increased national exports in the form of liquefied natural gas (LNG), could increase the cost of natural gas. There have been several natural gas pipeline expansion projects proposed throughout New England but to this point no natural gas electricity generators have committed to firm capacity—meaning that all the firm capacity in the region is allocated to local distribution companies (LDCs) for home heating purposes. Essentially, any gas available to generators from expanded gas pipelines will be available on the secondary gas market, with supplies still constrained during very cold weather, regardless of the amount of pipeline expansion in the New England. One hurdle facing policy makers is how to drive natural gas electricity generators to commit to firm pipeline capacity. ISO-NE's Pay-for Performance[9] program penalizes non-performance by electricity generators to operate when called upon (in scarcity conditions) by essentially transferring capacity payments from generators who under perform during shortage conditions to those who over perform. Unfortunately, Pay-for-Performance has done nothing to incentivize natural gas generators to subscribe to firm pipeline capacity.

Recommendation: Advocate for market reforms at ISO that incent natural gas generators to subscribe to firm pipeline capacity. One consideration is for ISO to tie firm fuel supply to capacity payments ensuring that those resources that commit to capacity can be dispatched when needed. However, this type of market reform should be thoroughly studied as it could also lead to reduced Capacity Supply Obligation (CSO) commitments from natural gas generators—possibly leaving New England short on electricity capacity.

Grid Modernization

On July 13, 2105, the NH PUC opened a docket to investigate grid modernization in New Hampshire.[10] In March 2017 a final report[11] was issued making recommendation that will ultimately lead to a filing for a grid modernization plan by utilities. Grid modernization has focused on changes to the grid infrastructure and premises equipment to allow for more

[9] http://www.iso-ne.com/committees/key-projects/fcm-performance-incentives

[10] https://www.puc.nh.gov/Regulatory/Docketbk/2015/15-296/INITIAL%20FILING%20-%20PETITION/15-296%202015-07-30%20ORDER%20OF%20NOTICE.PDF

[11] http://www.puc.state.nh.us/Regulatory/Docketbk/2015/15-296/LETTERS-MEMOS-TARIFFS/15-296_2017-03-20_NH_GRID_MOD_GRP_FINAL_RPT.PDF

responsive actions by utilities and end users. This may include allowing customers to better adjust their electricity consumption based on real time electricity pricing, and allow utilities more options in maintaining/improving the transmission and distribution grid. Time of Use Pricing and requisite Smart Meter have the potential to empower electricity consumers with the ability to better manage their electricity load in response to price signals from the wholesale energy markets. This could be a benefit for both the individual consumers and the regional users of electricity.

It should be the policy of the State of New Hampshire to advocate for policies that reduce costs to its families and business; allows the market to determine generating resources; and empowers regulators to choose least-cost options for utility investments in grid infrastructure—whether they be traditional "poles and wires" or non-wire alternatives.

Recommendations: Any investigation into electric grid modernization needs to begin with a thorough analysis of the cost impacts to ratepayers and answer a very simple question: will any legislative or regulatory endeavor result in increased electricity rates to ratepayers? If the answer is yes, then that avenue should not be pursued.

As an example, for the foreseeable future the grid modernization technologies that could be implemented should be utilized on an opt-in basis to avoid universal cost increases to all customers when only a small portion of consumers may benefit or even engage in behavior that would provide cost savings to them. There is considerable evidence[12] that universal smart grid deployment would not offer benefits and cost savings to all ratepayers, which is why an opt-in policy requiring the "pro-sumer" who wants to participate in TOU pricing to pay for the necessary upgrades (meters, etc.)—eliminating the possibility of non-participants from subsidizing participants.

There are many facets to grid modernization (e.g. distributed generation, demand response, energy storage, voltage control). With this in mind, any grid modernization plan should emphasize that private investment and consumer demand should be the driving forces behind grid modernization. Additionally, any investments by utilities in grid modernization should represent the least-cost option for their ratepayers.

About NERA

NERA is a non-profit advocacy group focused on promoting sound public policy that protects utility customers, both families and businesses, and lowers the cost of regulated services. Lower cost energy, water, and telecommunications services in New England will be an important driver for keeping the region's economy competitive and retaining and returning manufacturing and high-tech jobs for the 21st century

[12] http://www.sciencedirect.com/science/article/pii/S0301421517304688

Thank you for the opportunity to submit these comments on behalf of our members.

Sincerely,

Marc Brown
Executive Director
New England Ratepayers Association
PO Box 542
Concord, NH 03302
603-369-4301

Good afternoon,

It is my pleasure to submit the attached comments to Office of Strategic Initiatives on behalf of **Timberland, Stonyfield Farm, Worthen Industries, and Gravity Group New England.** As companies headquartered in New Hampshire, these businesses appreciate the opportunity to provide detailed testimony as OSI considers potential updates to the 10-Year Energy Strategy.

Please do not hesitate to reach out to us with any questions.

Sincerely,

Matthew

Matthew Willner
Senior Associate, State Policy
Ceres
617-247-0700 ext. 210
willner@ceres.org
www.ceres.org

Follow us on Facebook, LinkedIn and Twitter!

Jared Chicoine
Director
NH Office of Strategic Initiatives
Governor Hugh J. Gallen State Office Park
Johnson Hall, 3rd Floor
107 Pleasant Street
Concord, NH 03301

November 6, 2017

Dear Mr. Chicoine,

As businesses with operations and facilities in New Hampshire, we appreciate the opportunity to provide comments on potential updates to the state's 10-Year Energy Strategy. We recognize the critical importance of renewable energy, energy efficiency, and other carbon reduction programs to advance our state's competitiveness. That is why we support robust policies to accelerate the adoption of clean energy in the electric power and transportation sectors.

New Hampshire has to import nearly all of the fossil fuel energy we use – sending significant resources overseas and to other states. Renewable energy, energy efficiency, and energy storage are homegrown resources that can help grow our local economy.

Energy is also a significant part of our operating costs – powering our facilities, machines, and vehicles. Clean energy helps businesses like ours cut costs, avoid the volatility of fossil fuel prices, and stay competitive. Embracing renewable energy and energy efficiency not only makes economic sense for our businesses, but it is also the expectation of our customers, employees, and investors.

That is why businesses like ours are increasingly committed to utilizing renewable energy and energy efficiency. State-level policies have the potential to accelerate this transition, and New Hampshire should have an energy strategy that drives innovation and investment. As neighboring states continue to demonstrate long-term commitment to clean energy solutions, we believe that New Hampshire must rise to the challenge.

As New Hampshire considers updates to the 10-Year State Energy Strategy, we submit the following recommendations:

New Hampshire should bolster our energy efficiency program. We applaud the creation of New Hampshire's first Energy Efficiency Resource Standard (EERS) through the settlement agreement on April 27, 2016.[1] The settlement agreement also began to modify utility rate structures, which previously discouraged energy efficiency investments, with the addition of a

[1] PUC Docket no. DE 15-137

Lost Asset Recovery Mechanism (LRAM). We believe that the state should explore additional policies and rate structures to remove disincentives and encourage the utilities to embrace energy efficiency more rapidly.

New Hampshire should continue to strengthen our Renewable Portfolio Standard (RPS). New Hampshire's RPS has succeeded in spurring investment in renewable energy resources and reducing our reliance on imported fossil fuels. Between 2007 (the first year of the RPS) and 2015, New Hampshire's renewable energy generation increased from a baseline of 10 percent to 17 percent. These new renewable resources helped to displace aging coal plants. RPS programs are most successful when they are strong, stable, and predictable. New Hampshire should embrace a long-term policy vision to ensure we meet our goal of 25% renewable energy by 2025, and begin exploring how to increase its ambition for the program post-2025.

New Hampshire should prioritize grid modernization as a strategy to increase efficiency and reduce costs to ratepayers. Upgrading our state's electric and gas infrastructure can play a significant role in increasing the resilience and flexibility of our power system. Reducing peak load, which is when the dirtiest, least efficient power plants must be used, should be a priority for New Hampshire to reduce grid vulnerability and reliance on fossil fuels. Making investments to accelerate the adoption of time-of-use pricing or peak time rebates, along with investments in micro-grid systems, will help New Hampshire further harness the market to reduce energy waste and increase efficiency.

New Hampshire should provide greater incentives for clean energy generation. Several policy changes could unleash additional renewable energy investment in New Hampshire. New Hampshire should advance policies to promote investment in new renewable energy in the state by strengthening financial incentives, lifting the net metering cap and ensuring robust tariffs, and better leveraging the Renewable Energy Fund and Regional Greenhouse Gas Initiative proceeds to support an infusion of private capital into renewable energy projects.

New Hampshire should adopt California's Zero Emission Vehicle (ZEV) program. The 2014 State Energy Strategy expressed support for New Hampshire adopting California's ZEV Program, which requires automakers to sell increasing numbers of electric vehicles in participating states, and would help drive the availability and uptake of EVs in New Hampshire. Several other states have recognized the value of promoting ZEVs in their states. The eight states that have adopted the ZEV program—including Massachusetts, Vermont, Connecticut, New York and Rhode Island—represent 29% of the U.S. vehicle market and have signed an MOU to work together to build a robust electric vehicle (EV) market and increase consumer and fleet acceptance and uptake of EVs. New Hampshire is the only state in New England that has not adopted the ZEV Program, which does the state a disservice as increased EV deployment in NH will result in significant public health benefits, reduced fuel costs, and increased fuel diversity. We strongly support renewed consideration of our state's participation in the program.

New Hampshire should consider regional approaches to reducing emissions from the transportation sector. In 2016, emissions from the transportation sector surpassed those from the electric power sector, and New Hampshire currently has no overarching policy to confront this challenge. Recently, the governors of Massachusetts and New York have indicated that a

regional market-based approach to confront transportation emissions is under discussion. Under a market-based approach, clean transportation fuels, such as electricity, will significantly reduce greenhouse gas emissions in New Hampshire in coordination with renewable energy programs. We believe that New Hampshire's participation in this initiative is crucial for our competitiveness in the region, and strongly support efforts to put our state on the leading edge of clean transportation policy.

Thank you again for the opportunity to submit comments on New Hampshire's 10-Year Energy Strategy. Please do not hesitate to contact us with any questions.

Sincerely,

Stonyfield Farm
Timberland
Worthen Industries
Gravity Group New England

Jared and all,

Thank you for the opportunity to comment on the NH 10 Year Energy Strategy. Please find NHDES comments attached.

Sincerely,

Becky

Rebecca E. Ohler
Administrator, Technical Services Bureau
NH Dept. of Environmental Services
(603) 271-6749

The State of New Hampshire
Department of Environmental Services

Robert R. Scott, Commissioner

November 6, 2017

Jared Chicoine, Director
State of New Hampshire
NH Office of Strategic Initiatives
Governor Hugh J. Gallen State Office Park
Johnson Hall, 3rd Floor
107 Pleasant Street
Concord, NH 03301

Re: Public Comment on Potential Updates to the State's 10-Year Energy Strategy

Dear Mr. Chicoine:

Thank you for the opportunity to provide written comments on the potential updates to the New Hampshire 10-Year Energy Strategy ("Energy Strategy"). The NH Department of Environmental Services (NHDES) is fully supportive of long-term, strategic energy planning that enables implementation of programs and policies to manage our energy costs and to protect our State's environmental and public health through strategic adoption of energy efficiency and cleaner energy options across all sectors.

NHDES has been an active and engaged participant in energy planning initiatives for more than two decades, including holding a seat on the New Hampshire State Energy Advisory Council in 2014, working with the former Office of Energy and Planning to produce the 2014 Energy Strategy. Should you need more information on or wish to discuss any of the issues presented in this comment letter NHDES would be happy to meet with you or your staff.

New Hampshire has no domestic sources of fossil fuels, and therefore must import them from other states and nations at a net cost to the NH economy. The combustion of fossil fuels emits air pollutants that have short and long-term negative public health impacts, increasing health care costs, and reducing quality of life. The combustion of fossil fuels further leads to the release of carbon dioxide, which is the leading cause of climate change and ocean acidification. New Hampshire has an opportunity to reduce the negative impacts of fossil fuel use by aggressively pursuing an integrated suite of energy strategies that significantly increases our investment in energy efficiency while building the state's capacity to sustainably supply clean sources of energy to heat, power and move a strong state economy. Therefore, NHDES offers the following specific comments relative to the State's Energy Strategy for the coming decade, recognizing that as technology advances, each of the following areas will be increasingly interrelated and require coordination within and across sectors.

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29 Hazen Drive • PO Box 95 • Concord, NH 03302-0095
(603) 271-3503 • Fax: 271-2867 TDD Access: Relay NH 1-800-735-2964

Invest in Energy Efficiency

New Hampshire's State Energy Strategy should continue to recognize energy efficiency as the most cost-effective means to address electric load growth in the state and within the Independent System Operators - New England (ISO-NE) grid and, thus, should be treated as the "first resource" for future investments. The Energy Strategy should also reflect the fact that energy efficiency investments alone may not be sufficient to lower consumption and load as the impacts of beneficial electrification[1] (*e.g.*, electric vehicles and heat pumps) create new forms of demand. Energy efficiency will play a central role in minimizing future costs by continuing to limit the amount of investment required for additional generation, transmission and distribution capacity.

The state should pursue energy efficiency opportunities through:

Efficiency Goals and Targets

- Support implementation of the State's Energy Efficiency Resource Standard (EERS), increasing the required savings goal over time to achieve all cost-effective efficiency, a target which is significantly greater than is established in the current three-year EERS;

Building Energy Codes

- Review and adopt, with NH appropriate amendments, the most recent version of the International Code Council Codes, including the International Energy Conservation Code, as soon as possible after they are published to ensure that all homes and businesses built or substantially renovated after that time will benefit from lower energy use and lower annual energy costs over the life of the building;

Financing

- Explore incorporation of a State-run Green Bank to leverage private investment and financing to accelerate energy efficiency procurement;[2]
- Explore ways to enhance energy performance contracting opportunities for cities and towns to reduce the need for upfront capital; and
- Increase the level of investment of Regional Greenhouse Gas Initiative (RGGI) funds in energy efficiency and support changes to New Hampshire's RGGI statutes and regulations to keep us in this regional program following the 2019 program changes.

[1] Beneficial electrification has been defined as, "*The use of electricity in end-uses that would otherwise be powered by fossil fuels (natural gas, propane, fuel oil, or gasoline) to reduce greenhouse gas (GHG) emissions.* From Keith Dennis, K., Lazar, J., and Colburn, K. (2016). More is Less: Environmentally Beneficial Electrification (EBE), https://www.iea.org/media/workshops/2016/epriieawashingtondc/DennisKEPRIIEAWorkshop.pdf.

[2] NASEO (2016). Growing Clean Energy Markets with Green Bank/EIP Financing, NASEO Annual Meeting, http://annualmeeting2016.naseo.org/Data/Sites/10/media/presentations/Schub.pdf.

Proceed With Grid Modernization

As has been noted by the New Hampshire Public Utility Commission (PUC), grid modernization is anticipated to enable electric utilities to take advantage of emerging, cost-effective technological developments (***e.g.***, renewable and distributed generation, storage technologies, electric vehicles), providing new service offerings, and helping customers to manage their electricity consumption. In doing so, grid modernization policies, technologies, and practices are expected to support safe, reliable electricity services while reducing generation, transmission, and distribution costs.

Based on the Grid Modernization report[3] presented to the PUC in response to the Grid Modernization investigatory docket, IR 15-296[4], grid modernization goals should include:

- Improve reliability, resiliency and operational efficiency of the grid;
- Reduce generation, transmission and distribution costs;
- Empower of customers to use electricity more efficiently and to lower their electricity bills; and
- Facilitate the integration of distributed energy resources (DERs).

In addition to these goals, NHDES recommends that grid modernization should also effectively accommodate beneficial electrification in the building and transportation sectors.

To achieve these goals, NHDES supports the following actions, which were contained in the report to the PUC:

- Integrate grid modernization efforts with other related energy efforts (***e.g.***, net metering, energy efficiency);
- Determine the appropriate level of meter technology that needs to be widely deployed to achieve results;
- Design electric rates that: fairly compensate the utilities and consumers for the services they provide to the grid; provide appropriate and efficient price signals to customers; and that incentivize consumers to use electricity wisely and invest in cost effective DERs; and
- Enhance transparency by giving consumers more information about their energy consumption, while protecting privacy, to empower consumers to respond to energy prices and market conditions.

[3] Public Utilities Commission (2017). New Hampshire Grid Modernization Working Group Final Report, IR 15-296, https://www.puc.nh.gov/Regulatory/Docketbk/2015/15-296/LETTERS-MEMOS-TARIFFS/15-296_2017-03-20_NH_GRID_MOD_GRP_FINAL_RPT.PDF.

[4] PUC (2017). IR 15-296 - Investigation into Grid Modernization Docketbook, https://www.puc.nh.gov/Regulatory/Docketbk/2015/15-296.html.

In addition, NHDES further recommends the following actions, which were included in NHDES's May 19, 2017 letter to the PUC, during the public comment period on the IR-296 report,[5] be taken as part of grid modernization efforts:

- Identify key barriers and disincentives to grid modernization that prevent NH's utilities from engaging in grid modernization as part of their standard business model;
- Identify the phases of grid modernization by considering whether certain barriers or disincentives need to be addressed first before further planning and action can be taken; and
- Align utility incentives and rewards with grid modernization goals to enable integration and fully realize the benefits of existing and rapidly emerging technologies and to allow new service providers to participate.

Encourage and Support In-State Renewable Power Generation

Renewable energy resources are abundant in New Hampshire, yet the state imports nearly 90 percent of the primary energy consumed by the overall economy.[6] These imports represent a direct cost to the state as energy dollars are "exported" out as the energy moves flow into the state. It is estimated that nearly two-thirds of energy expenditures, nearly four billion dollars in some years, leaves the state economy immediately as these imported sources of fuels are consumed.[7] In addition to experiencing a direct cost impact, the state is also subject to the impact of the global energy markets, which can create uncertainty with respect to price and supply.

Distributed renewable energy resources (***e.g.***, wind, solar PV) not only reduce long-term direct energy costs, but also reduce or delay the need for costly transmission and distribution investments and upgrades as these resources can often be located closer to areas of high demand. By being located closer to the point of consumption, distributed renewable energy generation is also subject to lower "line losses" typical of the conventional centralized energy grid.[8]

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[5] NHDES (2017). New Hampshire Department of Environmental Services Comments, https://www.puc.nh.gov/Regulatory/Docketbk/2015/15-296/LETTERS-MEMOS-TARIFFS/15-296_2017-05-19_NHDES_COMMENTS.PDF.

[6] NHDES analysis of EIA (2017). *State Energy Database. Table CT3. Total End-Use Energy Consumption Estimates, 1960-2015, New Hampshire*. US Department of Energy, Energy Information Administration, https://www.eia.gov/state/seds/data.php?incfile=/state/seds/sep_use/tx/use_tx_NH.html&sid=NH.

[7] NHDES analysis of EIA (2017). *State Energy Database. Table ET1. Primary Energy, Electricity, and Total Energy Price and Expenditure Estimates, 1970-2015, New Hampshire*. US Department of Energy, Energy Information Administration, https://www.eia.gov/state/seds/data.php?incfile=/state/seds/sep_prices/total/pr_tot_NH.html&sid=NH.

[8] Line losses in NH and NE are estimated, per data provided by the US Department of Energy, Energy Information Administration, to be equivalent to over 30 percent of total primary energy. Source: NHDES analysis of EIA (2017). *State Energy Database. Table CT8. Electric Power Sector Consumption Estimates, 1960-2015, New Hampshire*. US Department of Energy,

By increasing utilization of New Hampshire's in-state renewable resources, such as solar, wind and biomass, the state will likely experience an important economic boost. This boost would be two-fold as dollars that would have been exported or invested in transmission and distribution resources are retained and remain circulating in the local economies, and as the industries associated with building, installing and maintain renewable systems create and sustain local jobs.

In addition, as the beneficial electrification of the transportation sector and heating and cooling technology (e.g. air source heat pumps) continues, a grid powered increasingly by clean renewable energy will be necessary to preserve our clean environment and quality of life in New Hampshire.

To achieve these outcomes, NHDES recommends that New Hampshire take the following actions:

- Maintain a stable policy environment relative to renewable energy that provides clean energy firms with the certainty they require to undertake long term planning to develop projects in the state, and to establish permanent business and operations centers here;[9]
- Investigate ways to increase and sustain the capacity for businesses, local governments, and residents to invest in clean renewable distributed generation as well as invest in renewable thermal systems;
- Support the development of reliable financial mechanisms that enable the upfront capital investments in clean distributed generation projects;
- Support rate design for distributed renewable generation that fairly compensates 1) the distribution utility for the service provided by the grid, and 2) the host, whether a business, local government or a resident, for the full value they provide to the local and regional grid, inclusive of: time and location of the generation; the environmental benefits; and carbon benefits;
- Enable a range of distributed renewable energy ownership options such that residents from low and middle-income households are able to benefit from the revenues and/or generation;[10] and
- Work with real estate and mortgage interests to ensure that renewable energy systems, as well as energy efficiency measures, are properly valued during home

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Energy Information Administration, https://www.eia.gov/state/seds/data.php?incfile=/state/seds/sep_use/eu/use_eu_NH.html&sid=NH.

[9] This has been a consistent theme in energy planning and was documented as the primary theme by the Energy Efficiency and Sustainable Energy (EESE) Board in 2012. EESE (2012). *Final Report On the New Hampshire's Independent Energy Study*, https://www.puc.nh.gov/EESE%20Board/Meetings/2012/20121116Mtg/VEIC%20-%20EESE%20Board%20Final%20Report%20-%20Formatted%20DRAFT%20111612.pdf.

[10] A recent example is the "NH Solar Shares" program being developed by, among others, the Plymouth Area Renewable Energy Initiative, http://nhsolarshares.org/.

appraisals to ensure that homeowners are fairly credited for the energy investments that they make in their homes. By ensuring that they will receive value during the resale of their homes, homeowners may be more willing to make investments in properties that might be sold prior to the pay-off period.

Plan for the Transformation of the Transportation Sector

Motor vehicles are responsible for a range of harmful emissions, including local air toxics and vehicles are the main contributor to ground-level ozone, the primary component of smog that can cause significant health issues, particularly in the young and elderly. The transportation sector is also the largest source of greenhouse gas emissions in the state. Therefore, actions to reduce the impact from this sector are a vital component of an overall state energy strategy and should embrace opportunities to improve overall efficiency of the transportation system, reduce emissions from conventional vehicle and engine technologies, and embrace and prepare for the transition to new technologies.

New Hampshire is a relatively rural state so reducing the miles traveled and thus the gasoline and diesel consumption by passenger vehicles and trucks will remain a challenge. However, the energy cost and air quality impacts of vehicle petroleum fuel use are such that the state should purse action in this area over time. Other changes in the transportation sector are coming rapidly that offer more near-term opportunities to effectively manage our energy use.

The Energy Strategy should embrace the increased efficiency of emerging technologies. Electric vehicles (EV) are coming swiftly into the market and as technology rapidly improves EVs will, in all likelihood, make up a significant percentage of our in-state vehicle fleet and that of our out-of-state visitors in the coming decade. Electric vehicles transform energy into motion far more efficiently than conventional combustion vehicles. Increased use of EVs will help to reduce emissions from this sector (currently the largest source of ozone-forming and greenhouse gas emissions), but will add additional demand on our electric grid, thus posing both challenges and opportunities to New Hampshire.

The Energy Strategy should also recognize the changing demographics of our state. New Hampshire's population is rapidly aging and we will need, in the relatively near future, to provide mobility for our seniors through alternative transportation modes. If the portion of our elderly population that does not need institutional medical care can "age in place", this will ultimately be less costly to our society and increase the quality of life for those individuals. In addition, younger generations have demonstrated a preference to live and work in areas that provide alternative transportation modes and/or that reduce the need to drive through smart growth policies. Our Energy Strategy should incorporate planning for these needs that may be met through emerging technologies including EVs and the autonomous vehicles that the EV platform enables, in order to retain and attract younger generations to the state.

Reducing our petroleum fuel use in the transportation sector will provide economic benefits to the state as the majority of transportation energy dollars immediately leave the State's

economy to pay for imported fossil fuels. A concerted effort to reduce our fossil fuel use, including increasing the availability of in-state renewable energy resources that serve the grid, increasing vehicle energy efficiency, decreasing total miles driven, providing cost effective transportation alternatives, and improving traffic flow will help stem this flow of capital out of the state.

NHDES recommends a further investigation of several policies that could reduce energy use and emissions from this sector, including:

- Adoption of California low-emission and zero-emission vehicle requirements (in place in all other New England states) would help ensure continued progress as previously approved federal are being reexamined;
- Utilize Volkswagen settlement funds, as allowed, to ensure adequate EV charging infrastructure in the state;
- Lead by example in the transportation sector:
    - Install charging infrastructure for the state employees – charge a fair market value for their use; and
    - Replace retiring state vehicles with EVs where feasible (which it is for most of the passenger fleet)
- Invest in and provide support for public transportation systems including both transit and rail.

Thank you again for the opportunity to provide comments on the Energy Strategy. NHDES looks forward to collaborating with your office and other stakeholders to support the development of a strategy that charts an energy path that will take advantage of the opportunities to provide both environmental and economic benefits to New Hampshire's citizens.

Respectfully,

Robert R. Scott
Commissioner
NH Department of Environmental Services

Hi Jared, Joe and Chris,

Please find NHSEA's comments on potential updates to NH's 10 year state energy strategy, attached.

Thanks for extending the deadline as well, very helpful for us and others!

Hope to see you all soon,

Best,
Kate

--
Executive Director
NH Sustainable Energy Association
603.777.7700
www.nhsea.org

NEW HAMPSHIRE
SUSTAINABLE ENERGY
ASSOCIATION

New Hampshire Sustainable Energy Association

RE: Comments on the 2017 review of the 10-Year State Energy Strategy

November 6, 2017

Dear Director Chicoine and Deputy Director Doiron:

Thank you for the opportunity to provide comments about updates to NH's Ten-Year State Energy Strategy. NHSEA is our state's only non-profit dedicated solely to advancing clean energy through education and advocacy. We have over one hundred business members in our Clean Tech Council (NHSEA's business group) and over three hundred individual, student and other institutional members. NHSEA also coordinates the NH Local Energy Solutions Work Group, the NH Wood Energy Council, and is the co-founder of the Drive Electric NH coalition.

NH can and should harness greater amounts of clean energy to lower its energy costs, to make our state resilient, to grow jobs, to retain energy dollars in our local economy, and to keep our state competitive both regionally and nationally. It can do all of this using current technologies. Any updates to the state energy strategy should both reflect this and include policy measures to ensure these outcomes while maintaining overall policy stability. Better metrics and/or goals to measure these outcomes are needed in our state's energy strategy. One example of a goal, offered in the original strategy process, was to retain $1 billion of our energy dollars in our state's economy by 2025 (from a 2014 baseline).

Specifically, here are some policies, actions, and strategies that NH can use to lower energy costs and increase in-state clean energy resources.

1) By investing in local clean energy resources (including renewable energy generation, energy efficiency, conservation, demand reduction, and storage), NH can avoid and/or mitigate a portion of its share of regional transmission costs.[1]

The NH Electric Cooperative (NHEC) is building a $5 million, 2 megawatt (MW) solar system. As their press release states:

""Costs for wholesale generating capacity and transmission, which have risen dramatically in recent years, have been of considerable concern to NHEC and its members. At current costs, the Moultonborough project's output is expected to save NHEC more than $280,000 per year in costs it would otherwise incur for purchase and delivery of the same products at wholesale from sources outside its system." And:

"The project will also support NHEC's efforts to explore new initiatives that can benefit members, including utility-scale power storage that can help further reduce the financial impact of periods of peak demand when power prices spike."

[1] Transmission costs account for about 20% of a customer's electric bill. Alternatively, for example, renewable energy policies account for about 1% of a person's electric bill (Source: Public Utilities Commission)

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Utility investment in projects and technologies on the distribution system can help avoid or mitigate costs they would otherwise incur from the regional or state transmission, capacity, or distribution markets. NHEC can invest without Public Utilities Commission oversight; however, the other three investor-owned and regulated utilities also are able to make similar investments. They can do so through a NH Statute, RSA 374-G. 374-G states that *"A New Hampshire electric public utility may invest in or own distributed energy resources [DER], located on or inter-connected to the local electric distribution system."*

The law describes DER broadly:
"Distributed energy resources" means electric generation equipment, including clean and renewable generation, energy storage, energy efficiency, demand response, load reduction or control programs, and technologies or devices located on or interconnected to the local electric distribution system for purposes including but not limited to reducing line losses, supporting voltage regulation, or peak load shaving, as part of a strategy for minimizing transmission and distribution costs as provided in RSA 374-F:3, III."

Utilities may use 374-G toward projects each up to 5MW in size and to invest in significant overall capacity, which can result in avoided capital upgrades to the distribution system and increased in-state supply of distributed energy resources:

"Distributed electric generation owned by or receiving investments from an electric utility under this section shall be limited to a cumulative maximum in megawatts of 6 percent of the utility's total distribution peak load in megawatts."

Non-utility distributed energy resource investments can also help customers and end-users to control costs and to lower their electric bills. One option is to allow for larger individual project sizes to utilize net metering:

- Allow projects from 1 megawatt up to 5 megawatts to net meter. These projects are at customer sites where the customer pays all transmission, distribution and demand charges on their electric bill and only receive a credit for the net electricity that they export to the grid that is valued at the default energy service rate.
  - Large end-users (manufacturers, municipalities) have large loads and often significant land and/or roof space available: allowing them to invest in projects greater than 1 MW would foster better economies of scale and greater savings.
    - For example, Rochester School Department has a 720 kW solar system. Their five solar arrays are anticipated to generate approximately 30% of the schools' electricity use using a power purchase agreement (PPA) PPA with a developer, who charges Rochester a reduced rate for the electricity the solar arrays produce for 25 years, saving the Rochester School Departments up to $500,000. Rochester could use another 1.5 MW of solar in order to meet their load.

In general, net metering continues to be a critical policy and needs to be upheld in NH. It is beneficial to all electric ratepayers in the state, including for participants and non-participants.

Controlling and lowering customers' demand charges through efficiency, demand response or on-site storage is another option to lower costs. As a recent 2017 report published by the U.S. National Renewable Energy Laboratory states:

> *"Demand charges are designed as a way for utilities to recover costs associated with providing sufficient electricity generation and distribution capacity to their customers. By basing a portion of a customer's electricity bill on their peak level of demand, the utility distributes more of the costs associated with building and maintaining system capacity to those who contribute most to the need for increased capacity. Demand charges are typically based on the highest average electricity usage occurring within a defined time interval (usually 15 minutes) during a billing period. Unlike electricity consumption charges, which account for the volume (kWh) of electricity consumed throughout a billing period, demand charges track the highest rate (kW) of electricity consumption during the billing period. The greater the need for electricity at any time during the period, the higher the customer's demand. Demand charges can be 30-70% of a customer's bill. The analysis looked at the number of commercial customers potentially eligible for utility rate tariffs that include demand charges of $15 or more per kilowatt, an industry benchmark for economic storage opportunities using current technology and pricing."*[2]

In NH, the demand rates for Eversource are significant:

Eversource Rate LG, Commercial and Industrial Service[3]:
(For commercial and industrial customers with demands in excess of 1,000 KW)
Total Rate LG Demand charges = $13.37 per kVa
Rate GV, Commercial and Industrial:
(For commercial or industrial customers with demands not exceeding 1,000 kW)
Total Rate GV demand charges = $14.34 per kW

Avoiding or lowering these demand charges on the customer bill through on-site storage, generation or demand reductions should be explored. In addition, customers need greater education on their options for doing so. Making NH ready, flexible, and welcoming (through education, awareness and policy frameworks) for storage technologies, such as Massachusetts and other states around us are doing, is essential overall.

Real-time price transparency and rate design is another tool to consider as a means to lower and control costs. Currently, we have a system where we pay the same rate for a kilowatt-hour regardless of the time of day. This averaged rate on the customer bill (rates may change seasonally) does not reflect the hourly and daily fluctuations in the wholesale market prices. For example, it costs a typical residential customer the same amount on their bill whether they run their dryer for an hour at 2:00am or an hour at 8:00am on a cold winter morning. However, that hour has a significantly different cost profile at each

[2] NREL Report, 2017: https://www.nrel.gov/docs/fy17osti/68963.pdf
[3] https://www.eversource.com/Content/docs/default-source/rates-tariffs/nh-electric-rates.pdf

of those times, and is likely much more expensive during the 8:00am hour. Enabling the technology, rate design, and billing systems to connect consumers to the real-time price would better allow us to make decisions, based on price, of when to consume or conserve energy. This is a modification that NH utilities can make voluntarily and with PUC and/or legislative guidance and approval.

2) Use the maximum allowable amount (15%) from the Volkswagen settlement funds to NH for electric vehicle (EV) charging infrastructure.

NH needs universal fast-charging infrastructure along all of its major travel corridors, both for residents and for tourists. Using this settlement funding to invest in public charging, and/or to incent public-private partnerships to leverage greater investment in EV charging infrastructure, is smart economic and energy policy for our state. It will also allow NH to access more of the settlement funds in the future, funds that may not be available to us should we forgo the opportunity to invest this first round of funding into EV charging infrastructure.

Looking beyond the settlement funds, NH utilities can follow the lead of Liberty Utilities and the NH Electric Cooperative by taking action to incentivize and encourage a transition to EVs. These actions include, but are not limited to: tariff changes in order to allow the resale of electricity at charging stations, incentives to purchase EVs or charging stations, and special rates that ensure that as EV adoption increases, we use these resources to smooth (and lower) our demand curve, rather than create deeper "peaks and valleys."

3) Create a time-bounded and sustainable funding mechanism for all renewable energy technologies, thermal and electric.

The current funding mechanism for supporting in-state renewable energy generation is unpredictable and unstable. Using Alternative Compliance Payment (ACP) funds from the state's Renewable Portfolio Standard policy creates a situation where the Renewable Energy Fund (REF) funding changes from one year to the next, with little-to-no predictability or market stability. NH needs a funding mechanism that is predictable, stable, protected from budgetary raids, and includes a streamlined glide path toward an end date that is linked to market transformation. While the incentives for renewable energy have often worked well due to the fact that they continue to decrease over time as costs for those technologies decline, the overall program budgets are not matched with market demand, thus creating program closures and market interruptions. This market instability can cause job loss and decreased consumer confidence in the state's policymaking, which ultimately hampers investment and market transformation.

4) Update New Hampshire's energy and building codes.

NH simply needs to update its outdated codes to the current (or 2015) International Energy Conservation Codes. Doing so will save building owners significantly on costs: the operating costs are lower and the comfort and health levels are higher for buildings built under the current IECC.

5) Continue to pursue, and invest in, all cost-effective energy efficiency.

Since the 2014 State Energy Strategy, NH created and is implementing an Energy Efficiency Resource Standard (EERS). This is commendable and is one of the strongest policies our state has in place to protect consumers, control consumer energy costs, and uphold the legislative mandate to prioritize energy efficiency as a first-order resource.[4] This policy must be upheld, strengthened, and expanded. Weakening this policy in any way, including tactics such as allowing some customer sectors to "opt-out", by withholding funding to invest in the energy savings, allowing RGGI auction revenues to go to ratepayer bill credits instead of energy efficiency programs, or by creating uncertainty in programming from one year to the next, will result in higher energy costs for consumers and market instability.

As a complement to, and a part of, the EERS, any revisions to the state energy strategy should include concrete, enforceable, and funded goals to reduce peak electricity demand. In 2015, the Legislature passed HB614, which instructed the PUC to set a peak demand reduction goal. The PUC did so, but without any details as to how that goal would be met and without any reporting or follow-up since that Order. Peak demand reduction is a critical strategy to reducing costs, and in future years could be better incorporated into the EERS (or in addition to it).

6) The thermal supply and demand of the state must be prioritized as much as the electric supply and demand of the state, and import of expensive fossil heating fuels reduced through renewable heating technologies in state.

NH is heavily dependent on imported fuels to meets its thermal needs, particularly on heating oil. This dependence sends hundreds of millions of dollars out of the state every year, much of which could be retained in our economy if NH better helped businesses and residents switch to modern biomass heating using wood chips and pellets, and other renewable thermal technologies (solar and geothermal). The State Energy Strategy should set a goal for fuel switching from imported fossil heating fuels to renewable fuels and technologies controlled within our state, as the Vermont Comprehensive Energy Plan has done, for example, 30% of all heat energy from renewable heating sources by 2030. Given the link between oil prices and consumer motivation to make the investments needed to switch fuel use, NH needs to offer greater education, market, incent, and prioritize this switch both in times of low oil prices and high. Section 5.4.1 on "Biomass Thermal" should be prioritized [in any final updates to the state energy strategy] and expanded to include detailed recommendations on transforming NH's heating market in order to continue the excellent progress that has already been made to deploy modern wood heating technologies in our state's buildings and homes. Specifically, NH's RPS should continue its renewable thermal carve-out in Class I, increasing the requirements each year as designed, and it should also instruct the PUC to adjust the biomass rebate program incentive levels as the market demands (depending on the price of heating oil). These measures will help to strengthen markets for low grade wood so essential to the forest products industry and the practice of sustainable forestry. In addition, the state should set goals for integration of renewable heating technologies into state facilities and into the University System of NH campuses.

All updates and modifications to NH's ten-year state energy strategy must look to the future: advanced clean energy, smarter infrastructure, and decreased carbon are parts of that future. NH can choose to

[4] The cost to save a kilowatt-hour (kWh) of electricity is less than 4 cents, as opposed to costing about 17 cents when you but a retail kWh of supply. (Source: DE 15-137)

NEW HAMPSHIRE
SUSTAINABLE ENERGY
ASSOCIATION

lead this transition and can do so with a well-crafted energy strategy, using (but not limited to) the aforementioned recommendations.

Please feel free to contact me with any questions or to discuss any of these ideas further.

Sincerely,

Kate Epsen, Executive Director

kate@nhsesa.org

6

Attached please find Liberty Utilities' comments regarding revisions to New Hampshire's 10 Year Energy Strategy.

Please contact me with any questions.

Thank you

Michael

Michael Licata | Liberty Utilities (East Region) | Director, Government Relations
P: 603-216-3520 | E: Michael.Licata@libertyutilities.com
15 Buttrick Road, Londonderry, NH 03053

November 6, 2017

Jared Chicoine
NH Office of Strategic Initiatives
Governor Hugh J. Gallen State Office Park
Johnson Hall, 3rd Floor
107 Pleasant Street
Concord, NH 03301

Dear Director Chicoine,

Thank you for the opportunity to provide comments regarding the development of New Hampshire's 10-Year Energy Strategy. Long-term planning and goal setting are critical for the state to make informed decisions about its energy future and needs.

Liberty Utilities is New Hampshire's largest natural gas distribution company, serving roughly 91,000 customers in 31 communities throughout the state. Liberty also provides electric service to 44,000 customers in 21 communities, primarily in the Salem area and the Upper Valley. We believe that New Hampshire should be forward looking in its approach to meeting the energy needs of its citizens by promoting smart investments in new and emerging technologies that enable responsive energy systems to meet the changing needs of customers, and by investing in critical infrastructure that bolsters reliability and offers options to customers. Below are several actions which we recommend be incorporated into New Hampshire's 10-Year Energy Strategy:

Support the expansion of natural gas as a fuel option for the residents and businesses of New Hampshire.

- Increasing access to low-cost, clean burning natural gas is critical to economic development and reducing energy costs. Natural gas offers a less expensive option to meet the heating needs of residential and commercial customers, as compared to other fuels.

- Access to natural gas is critical to New Hampshire's manufacturing community. Natural gas is necessary for many manufacturing processes. Increasing the availability of natural gas to New Hampshire's business community reduces energy costs, which makes our businesses more competitive and allows for continued growth and economic expansion.

- Increasing access to natural gas also results in greater energy efficiency. High efficient natural gas heating equipment, combined with the utility managed state-wide energy efficiency programs can reduce costs, while achieving the highest resource efficiency.

15 Buttrick Road, Londonderry, NH 03053 - www.libertyutilities.com

- Increasing natural gas storage can stabilize energy costs by reducing winter-time pricing, when regional natural gas demand is highest. Increasing natural gas storage would provide New Hampshire's residents and businesses with access to a low-cost, stable source of energy.

Support utility investment in battery storage, grid modernization, distributed energy resources, and other technologies to reduce peak demand and regional transmission costs.

- The production, delivery, and consumption of electricity are rapidly changing. New and emerging technologies are providing customers with a myriad of options on how to meet their electricity needs.

- Distribution utilities play a vital role in the development and adoption of new technologies and energy reduction strategies. Utilities have strong relationships with their customers and therefore are well suited to meet the changing needs and desires of their customers.

- Investment in battery storage, grid modernization and distributed energy resources can provide options to customers and can also result in improved reliability and higher quality of service. These technologies can be used to reduce a peak demand, enable customers to shift consumption to lower cost periods, or provide real time information to utilities regarding the location and extent of outages. As a result, use of these technologies can lower operating costs and provide more rapid response to distribution system outages.

- New Hampshire regulators and policymakers should support and encourage utilities to offer programs and rate structures which will meet the growing desire of customers for increased distributed generation, energy efficiency, and a responsive grid, which will benefit all customers.

Support the collection and useful application of renewable methane gas from landfills, wastewater treatment plants, and agricultural processes.

- According to the National Oceanic and Atmospheric Administration (NOAA), methane from agriculture, waste disposal, and wastewater treatment accounts for 58 to 67 percent of methane released to the atmosphere each year.

- The collection and use of these sources of methane can provide both environmental and energy benefits to New Hampshire.

- Supporting policies that encourage the capture and use methane from landfills and wastewater treatment plants can provide New Hampshire's residents and business with an additional low-cost, locally produced supply of renewable natural gas, while also reducing air emissions.

Update the utility least cost integrated resource planning process to accommodate the investment in grid modernization, non-wires alternatives, and battery storage.

- The current utility least cost integrated resource planning process is in some ways a remnant from the time of fully-regulated, vertically integrated utilities that were responsible for the planning and operation of generation, transmission, and distribution services for customers.

- Updating this process to recognize the fully restructured market in which utilities currently operate would result in better outcomes for customers and the proliferation of new energy service offerings.

Support the expansion of electric vehicle infrastructure through utility tariff changes, line extension policies, and investment in charging stations.

- As more customers choose electric vehicles, New Hampshire's infrastructure and regulation must keep pace.

- Electric utilities are well-positioned to encourage increased adoption of electric vehicles through new rate offerings and partnerships with private entities to increase investment in needed infrastructure.

Support full rate decoupling to remove barriers to energy efficiency investment, the adoption of grid modernization, customer-sited distributed energy resources, and new technologies.

- As previously stated, utilities play a vital role in the adoption and proliferation of new energy technologies and load reduction strategies. These new offerings can help to reduce energy costs and provide environmental and societal benefits to all. At the same time, policies that encourage the adoption of these new products can also impact the financial viability of regulated utilities as citizens use less energy, which can result in negative impacts to all customers.

- Revenue decoupling, where utility revenues are not tied to the amount of kilowatt-hours or therms sold, can help to encourage the adoption of energy efficiency programs, while ensuring the state's utility companies and their customers are not negatively impacted by an ever changing marketplace.

Support continued utility administration of state energy efficiency programs.

- For nearly 20 years, New Hampshire's utilities have offered statewide energy efficiency programs aimed at reducing the amount of electricity and natural gas consumed by customers. These programs have been enormously successful at reducing customers' costs, increasing building comfort, keeping our businesses competitive, and reducing air emissions.

Liberty Utilities

- New Hampshire's utilities have consistently proven to be good stewards of these programs. The Environmental Protection Agency has repeatedly recognized New Hampshire's utilities for our successful administration of the statewide energy efficiency programs. Compared to other states in New England, New Hampshire has the second lowest costs to save a lifetime kilowatt-hour, meaning that New Hampshire's utilities are among the most efficient at reducing energy usage.

- While some have discussed hiring a third-party to administer energy efficiency programs, we believe that this approach is not the best option for New Hampshire's businesses and residents. Each state has its own regulatory structure. Some neighboring states with many small utilities have chosen a single third-party administrator to reduce cost and standardize offerings. Given the relatively small number of utilities in New Hampshire and long history of collaboration and efficient administration, however, we believe the utilities are best suited to continue providing the state's efficiency programs.

Support continued investment in cost-effective energy efficiency programs, which reduces costs for all customers.

- Energy efficiency remains the lowest-cost option to meet our state's growing energy needs. The state's continued investment in reducing the amount of energy consumed by customers provides environmental, economic, and societal benefits to all.

Support the development of combined heat and power (CHP) generation systems.

- CHP offers a number of benefits compared to conventional electricity and thermal energy production, including increased efficiency, reduced environmental impact, increased economic opportunities, and improved grid reliability.

- CHP enhances our energy security by reducing the State's energy requirements and helps businesses weather energy price volatility and supply disruptions while diversifying the energy supply by enabling further integration of locally produced and renewable fuels.

Thank you again for the opportunity to provide comments regarding New Hampshire's 10-Year Energy Strategy. I hope these recommendations will prove useful. Liberty Utilities would happily assist in any way with the development of a long-term plan that reduces costs and meets the needs of our customers.

Sincerely,

Susan Fleck
President, Liberty Utilities-NH

15 Buttrick Road, Londonderry, NH 03053 - www.libertyutilities.com

Office of Strategic Initiatives:

What will we tell our grandchildren? How can we sit idly by and do nothing to reduce our impact on climate change? These are the questions that haunts us today and, in 2012, propelled my wife and I to take further action to reduce our home's energy footprint. We had purchased a hybrid vehicle some years earlier and heard about the home energy star weatherization program. About this same time, our local (Temple) energy committee was helping people install solar hot water systems and purchase solar PV panels. The incentives and grants available enabled us to do more than we ever dreamed: In addition to weatherizing our home (at half the cost) and installing a solar hot water heating system, we had a 5,000 kilowatt PV system mounted on our roof. By selling power back to the grid, we cut our electricity costs in half. And that was after retrofitting our home for central air-conditioning (another consequence of global warming). We also cut our fuel oil bill in half!

We are far from wealthy financially, however, our lives and that of our 3 children were greatly enriched by this "living demonstration" that people are not powerless and we do not have to succumb to manipulation and further profiteering by the fossil industry. We can (and did) reduce our production of greenhouse gasses, dependence on global warming fossil fuels by these modest changes to our home. If individuals can have impact their own lives so dramatically, just imagine what energy planners like yourselves can do at the state level!

Clearly we are at a crossroads. We never would have thought that solar energy generation could be so successful in our climate -but it is. Moreover, studies have shown that we do not lack sufficient conventional energy sources in NH. We simply lack the imagination and courage (political will) to stand up and say, "enough is enough." We and many of our neighbors refuse to believe that we are powerless to combat and reduce our greenhouse gas production. The technology for solar and other alternative energy production equipment is 50-75% less today than it was in 2012. And the technology for energy capture -especially solar PV - improves almost on a daily basis.

Now is the time to move our state forward and demonstrate -to our neighboring states and entire nation- that green power is a viable alternative to fossil fuels. We should set goals of reducing our fossil fuel use for power generation to zero by 2030 and our overall fossil fuel use to zero by 2050. If we don't challenge ourselves and strive to reduce greenhouse gas emissions, what will we tell our grandchildren when the consequences of global climate change overtake us?

Gary & Connie Nielsen

Temple, NH 03084

To: Office of Strategic Initiatives

RE: New Hampshire's 10-Year Energy Strategy

Please find attached as an introduction to GPT, our 2016 NH Energy Summit presentation.

Our brief comments with regards to New Hampshire's 10-year Energy Strategy are as follows:

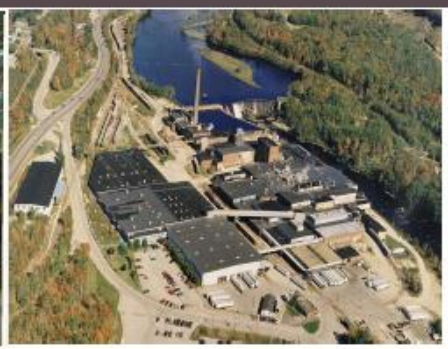
1. We would like to see more metrics to gage progress, or some objective measurement criteria that shows that it is working.
2. Smart meter technology should be incorporated .
3. Establish an independent administrator for expanded energy efficiency programs…similar to Efficiency Maine.
4. Natural Gas supply and availability…more pipeline capacity.
5. Transportation Options need to also focus on increased "weight limits".
6. Encourage small-scale CHP units for EV charging stations.

We would appreciate the opportunity to further discuss our comments with the OSI staff.

Best Regards,

Dick Arnold, CEO
Gorham Paper and Tissue LLC
White Mountain Tissue LLC
Cell: 207-478-5934
Office: 603-342-3644
Email: dick.arnold@gorhampt.com
www.gorhampt.com

Gorham Paper and Tissue LLC
White Mountain Tissue LLC


2016 New Hampshire Energy Summit

October 3, 2016

Dick Arnold, CEO

Introduction ~ Who we are…

- **Who we are…120 employees with 70,000 tons of production capacity**
  - **Gorham Paper and Tissue** started in May of 2011 when it re-started the former Fraser Papers facility. The legacy of Gorham is extensive, dating back to 1852 when the operation opened as a saw mill.
  - **White Mountain Tissue** began as a joint venture between the Gorham facility and the Old Town pulp mill, and launched with an investment of $35 million to install a state-of-the-art tissue machine. We are one of North America's only independent parent roll tissue suppliers.

2

2016 New Hampshire Energy Summit

Introduction ~ What we do….

- **What we do…produce tissue & towel products**
  - North American Market is about 9.2 MM tons
  - Growing annually at a rate of 1-1/2 to 2%
  - Historically, we have manufactured Parents Rolls for independent converters
  - Today…we have expanded our capabilities, White Mountain Tissue offers Consumer Paper Products

Our Business

- **Inputs ~ Controlling fiber, energy & people**
  - The winters of 2013 & 14 were disastrous for the business due to gas volatility forcing us to curtail operations
  - Customers looked elsewhere due to our erratic operations
- **Outputs ~ Parent Rolls, Consumer Products & Waste**
  - Responsiveness to our customer base/market
  - Efficient Operations
  - Spend lots of time rebuilding relationships following 2014
- **Attributes ~ Quality, Service/Performance & Value**
  - Customer confidence
  - Stability & Reliability
  - Competitiveness (new facilities south of Mason-Dixon line)
  - Responsible Sourcing & Sustainability practices

Our Product Line

Made in the USA Factory Certified

White Mountain Summit Products

- Ultra-Soft and Strong Bath Tissue 2-ply
- Premium Bath Tissue 2-ply
- 1000 count 1-ply
- Kitchen Towels (1-ply, 2-ply & recycled)
- Napkin

White Mountain Professional Products

- Hard wound & center-pull
- Multi-fold and C-fold
- JRT and Standard Roll
- Kitchen Towel
- Kraft, Natural & White

WOMEN OWNED™ CERTIFIED BY

Private Label

FSC
The mark of responsible forestry

SUSTAINABLE FORESTRY INITIATIVE
PEFC

COMING SOON

Mystic™ Luxury Products

- Ultra-Soft Bath Tissue with Aloe-E
- Extra Soft/Strong Kitchen Towel
- Facial ~ Aloe-E or anti-viral

Our Energy Platform

- **Energy ~ NG & LFG, Hydro & Public Service Power, Water & Heat (steam)**
  - Gas ~ annualized at 700,000 DT
    - Invested $6 MM in 2011
    - Direct connection to PNGTS pipeline
    - Methane Gas pipeline from District Landfill
  - Power ~ annualized at 80,000 MW's
    - 95% is hydropower
    - Interconnect agreement Gorham, Brookfield and Eversource
    - Gorham could not compete with a public service supply only

Concerns….

- **From an Energy Perspective,**
  - Oil back-up is inefficient…but partially mitigates risk
  - New tissue machine dependent on NG
  - Higher energy consumption during winter months ~ 3000 DT/day
  - Impact of NG volatility
    - Historically, increased energy costs during winter months have negated our margins; but eventually
    - Impacts our long-term viability and jobs…….
  - At the end-of-the-day, we need stability in our gas supply to remain competitive with those south of us……
  - Also, there may be growth opportunities with a stable NG supply, i.e. small-scale CHP units, expansion, converting, etc.

Thank You

Dear *Sirs/Madam*,

I attended the Energy Conference this last Saturday organized by the NHSEA. The following energy sources are not identified as follows:

- **NH has a, large number of large and small dams which hold a large amount of "Kinetic Flow Energy'. Which is wasted by pouring over a spillway and lost forever.**

- **In Europe they have taken to retrofitting "Archimedean Screw" generators [see attached] into many river and stream dams. The systems also act as "Fish Ladders" and have been proven not to damage or kill the passing fish [they can go both ways]. Note numerous Fish ladders are underused and yet water runs through them wasted.**

- **Here NH has a proven method to place/retrofit a "Microgrid of power systems" on dammed rivers/streams and feed the power into the local grid and for real emergencies NH experiences when the Power lines are damaged. Systems are available from 30 Kw to now 800 Kw.**

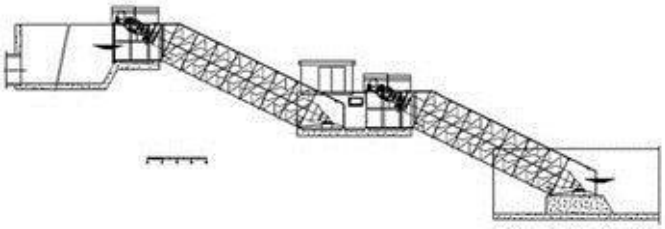
- **The State should encourage local Municipalities and counties to review all the dams for usefulness of the water flowing over them and plan to place an "Archimedean Screw "generator or generators. There are currently available Federal Tax incentives for Each State for "renewable/sustainable energy production".**

Please consider the above as my input for the revision of NH state Energy sources for the next push for renewable/sustainable production here in NH

Sincerely yours

Geoff Daly

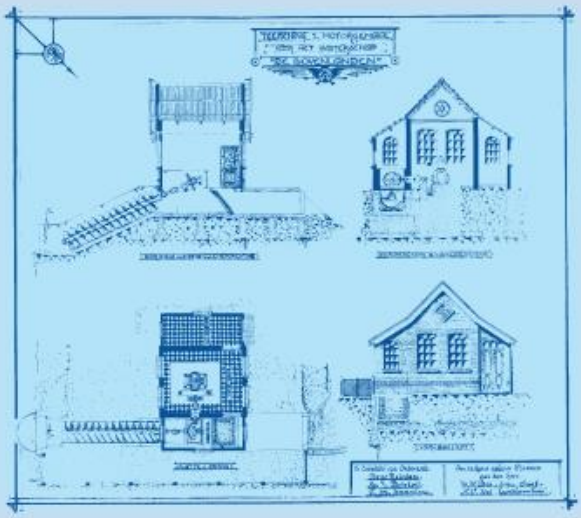
Nashua NH 03064-2877
USA.



Landustrie

COMPANY PROFILE

Company profile

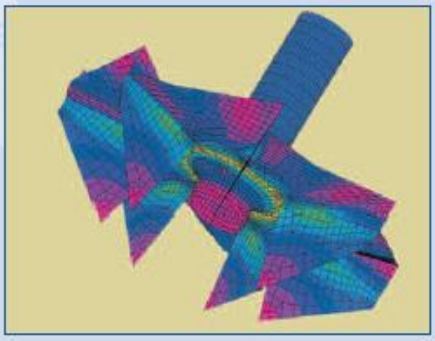


LANDUSTRIE

- Since 1913 Landustrie has been active with water. Starting with polder drainage, later during the reconstruction years after the Second World War with complete sewage treatment plants.
- Since the sixties Landustrie has also been well-known abroad. A reputation which is mainly owed by the product name LANDY. In short, Landustrie designs, supplies and installs equipment and turn-key installations for the water market. All these activities are performed from Frisian Sneek, where lots of surrounding water inspires to high quality products and solutions for the clients.

ORGANISATION

- The Landustrie organisation is formed by two product groups, PG "Waste Water Treatment" and PG "Pumps & Pumping Stations" in which group the Service department is accommodated.
- Within these product groups the Sales and Project Management are integrated. Both product groups make use of the heart of the company, the specialized machine shop.
- The organization is completed by the standard staff departments, such as Administration, Procurement, Quality Control, Product Data Management (PDM) and Personnel Department.
- An important position is taken by the Research and Development Department, which takes care that Landustrie anticipates on new developments in the different markets.



Landustrie

LANDUSTRIE

PG WASTE WATER TREATMENT

PRODUCTION

PG PUMPS & PUMPING STATIONS

PERSONNEL

Landustrie has a staff of approximately 155 people, of which many with long term employment. This not only shows that Landustrie is a pleasant company to work for, but also guarantees the fact that many years of experience are at the disposal of the client every day. In order to keep up with new techniques and developments our employees are offered frequent training and education.

LICENSEES

Since 1994 Landustrie closely cooperates with WesTech Engineering, Inc. from Salt Lake City, Utah, USA. The extremely successful cooperation has resulted in licensing the LANDY surface aerators in both the USA and China, under the same strict requirements.
In November 2008 the license contract between Maezawa Industrie, Inc. and Landustrie was signed. Maezawa, located in Tokyo, takes care of production and supply of Landox flow boosters in Japan.

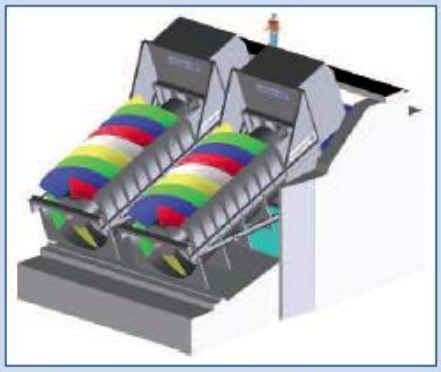
CERTIFICATION

Landustrie is in the possession of following certifications:

- ISO 9001 : 2008
- Contractors' Safety Checklist VCA**
- ATEX certificate for EC-Type examination
- Kiwa BRL-K14020/01 "Quality-controlled maintenance of pumping installations and pumping stations"

All Landustrie products are manufactured according the European guidelines, like for instance the Machinery Directive, Low Voltage Directive and the EMC Directive.

Company profile

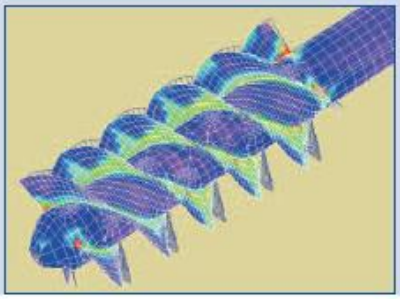


R&D

An important part of the Landustrie know-how has built up over many years by putting effort into Research and Development. The newest developments in the range of LANDY Archimedean screw pumps are the fish friendly screw pump and the hydropower screw. All this specific know-how and experience makes Landustrie the leading manufacturer in the world of screw pumps.
Further Landustrie owns an unique test tank (2200 m^3) in which a 1 : 1 scale aeration test can be carried through. This is one of the reasons that Landustrie for many years is the leading company in the field of aeration technology. In this quality Landustrie is a member of the European Norm Commission for oxygen measurements.

FINITE ELEMENT ANALYSIS

Landustrie has the capability to design all her equipment based on the Finite Element Analysis. This results in the optimum design for the equipment in terms of weight and robustness. For Landustrie this technique is a unique selling point.



INNOVATIONS

New markets and developments are actively approached. The most recent examples in the field of water technology are our mobile sanitation units (MobiSan). This sanitation technique has been developed in order to release pressure from existing water resources and reduce load on municipal waste water treatment plants. MobiSan is very well applicable in e.g. slums and refugee camps.
Another innovative product is our Dyke Monitoring and Conditioning system (DMC system). This system provides information about dyke condition by measuring pore pressure and temperature in the dyke body using fibre-optic sensors.

REFERENCES

On the Dutch market Landustrie counts as the market leader for the supply of electromechanical equipment for waste water treatment plants. It is worth mentioning that our products can be found at each sewage treatment plant in The Netherlands. Furthermore Landustrie is world-wide known because of the supply of thousands of screw pumps and surface aerators.

Shanghai, China

Porirua, New Zealand

Landustrie

STP BASF Ludwigshafen

Stora Enso, Sweden

PRODUCT GROUP WASTE WATER TREATMENT

This product group is split up into the different markets in which it operates. First of all the home market, where Landustrie already more than half a century not only supplies a big range of electromechanical equipment but also numerous complete sewage treatment works have been realized as a turn-key contractor.
Secondly the export market, in which Landustrie acts as equipment supplier. Through a worldwide agent network a number of products is marketed, like screw pumps, surface aerators, Landox flow boosters and screen cleaners.

Aeration rotor

Rental aerators

DELIVERY PROGRAM

Depending on the market, a summarized delivery program of Landustrie, is mentioned below:

- Screw pumps and screw pumping stations with newest developments such as
  - Fish friendly screw pumps
- Hydropower screws
- Surface aerators and aeration rotors
- Landox flow boosters
- Clarifiers
- Thickeners
- Screen cleaners
- Effluent treatment installations
- Flexible membrane gasholders
- Covers
- etc.

ERECTION

Many of the Landustrie products are installed by highly qualified and first rate equipped Landustrie personnel. This counts not only for the Dutch but also for the international projects. When the client decides to do the erection herself, Landustrie offers the option of sending out a supervisor for the right advice on site.

Indianapolis

AFTER SALES

Landustrie's after sales service is the customers connection to Landustrie for not only supply of spare parts but also for training and supervision. Worth mentioning are installation upgrades, some of which have amazingly short payback times through savings in energy and maintenance.

aftersales@landustrie.nl

+31.515.486.888

Landustrie

MANUFACTURING

Landustrie has it's own manufacturing facilities directly situated near open water and motorways.

The manufacturing departments are manned by highly motivated and experienced staff with a large know-how in manufacturing, assembling and installing all kinds of equipment of various materials. The company premises exist of an office building, machinery department, construction and assembling halls, totaling a surface of 1.6 hectares. The maximum hoisting capacity in the manufacturing halls is 200 tonnes with a free working height of 16 meters.

In addition to the mechanical disciplines, Landustrie has also in-house, it's own electrotechnical workshop, as well as blast and coating facilities.

DELIVERY PROGRAM

Facilities are not only very suitable for the manufacturing of Landustrie's own products but also to accommodate, if required under inspection, specialized products like;

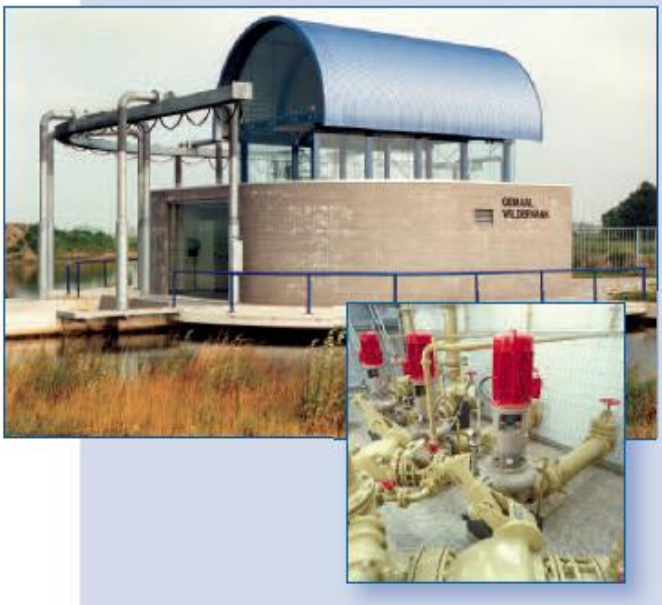
- Compiled steel constructions
- Tanks
- Apparatus construction
- Ship segments
- Yachts
- etc

The high quality end products are built according the standards formulated by either Stoomwezen, Lloyd's register, Germanischer Lloyd, Dansk Norsk Veritas etc.

MATERIALS

The majority of the equipment is manufactured in carbon steel, aluminium and different sorts of stainless steel. But our skilled and experienced personnel is also qualified to handle more exotic materials such as duplex, dillidur, hardox, weldox and armox , with great skill and craftsmanship.

Company profile



PRODUCT GROUP PUMPS & PUMPING STATIONS

Landustrie is also a leading player regarding the supply of pumps and pumping stations. For both the municipal and industrial market Landustrie designs and manufactures sewer and polder drainage pumping stations, executed with pumps of Landustrie's own make, Landy.
Before a Landustrie pump leaves the premises, it has been tested hydraulically at the test bed on capacity and power, and if desired witness tested by the client.
The electro technical installations are also built and tested in the workshop in Sneek together with the accompanying software.

A new range of waste water and mixing pumps is introduced in 2012. This new range matches the former series of Robot pumps, whereas ITT ceased the production of these pumps earlier. Our new Landy pumps are completely exchangeable with the existing Robot pumps and spare parts. All pumps, including Vortex and wear resistant type, can be supplied explosion proof.

DELIVERY PROGRAM

- Polder drainage pumping stations
  - screw pumps
  - axial flow pumps
  - mixed flow pumps
- High-pressure pumping stations
  - submersible disintegrator pumps
  - pumps with open channel impeller
- Pumping stations
  - dry mounted pumps
  - submerged pumps
  - mixed flow pumps
  - inclined rotor pumps
- Sewage pumps
- Turn-key pumping stations
- Electrotechnical installations
- Telemetry systems
- Pump testing

Landustrie

TELEMETRY

These days more and more demands are being placed on water management. Landustrie provides advanced technology, which automatically regulates and manages the controls, detection and data registration for pumps, treatment plants, etc. It is possible to

obtain information at any time by incorporating substations in existing and new facilities, which are connected to a central command post by data lines. Each substation can also be independently monitored and operated from the command or local post. Thanks to the specialised knowledge of Landustrie the above components and systems are developed and built entirely under our own management. These products are subsequently marketed under the names of LANDY-Web and LANDY-Line.

LANDY-WEB

Measuring and control system for water management in sewer/polder drainage stations and waste water treatment plants

LANDY-Web is a control and telemetry computer which stands out from other systems not only due to its simplicity and clarity, but most of all because of the high degree to which control processes can be analysed.

LANDY-LINE

Control and automatic fault reporting for sewer pumping systems

Landustrie has developed exceptionally comprehensive microcomputer control systems especially for sewer pumping systems. LANDY-Line is the ideal tool for sewer managers thanks to its carefully designed control functions, remote detection and data logging. By combining the LANDY-Line system with a LANDY-Web web controller you can achieve a highly reliable and cost-efficient system.

LANDY-PLC

PLC's are viewed as 'open' systems. Landustrie has everything you need in this area. The controls and adjustment can be provided by the PLCs of various makers, and the protocols are available in LANDY-Web web controller. An internet connection will provide the telemetry function.

LANDY-CARS

Landustrie supplies an open main control system especially for controlling unmanned operation installations like sewer drainage pumping stations, dams, polder drainage pumping stations, sewage treatment plants, etc. The newest version is suitable for the internet.

Landustrie

SERVICE DEPARTMENT

This skilled and experienced department is manned and organized for preventive and corrective maintenance of:

- pumps and pump installations
- waste water treatment plants
- screen cleaners
- gasholders
- electrotechnical installations according NEN-1010 and NEN-3140
- control systems

The results of periodical and precautionary maintenance are reported in writing or digitally, so that the client can take the required measurements, if necessary.

In order to be able to offer the client a fast and adequate service, the service department has about 20 fully equipped service vans ready to respond to service calls.

Within the Landustrie premises in Sneek the service department has it's own well equipped work shop where the experienced mechanics can do repair work which can't be done on-site.

In addition the service department has the possibility by means of telemetry systems to monitor and guard installations.

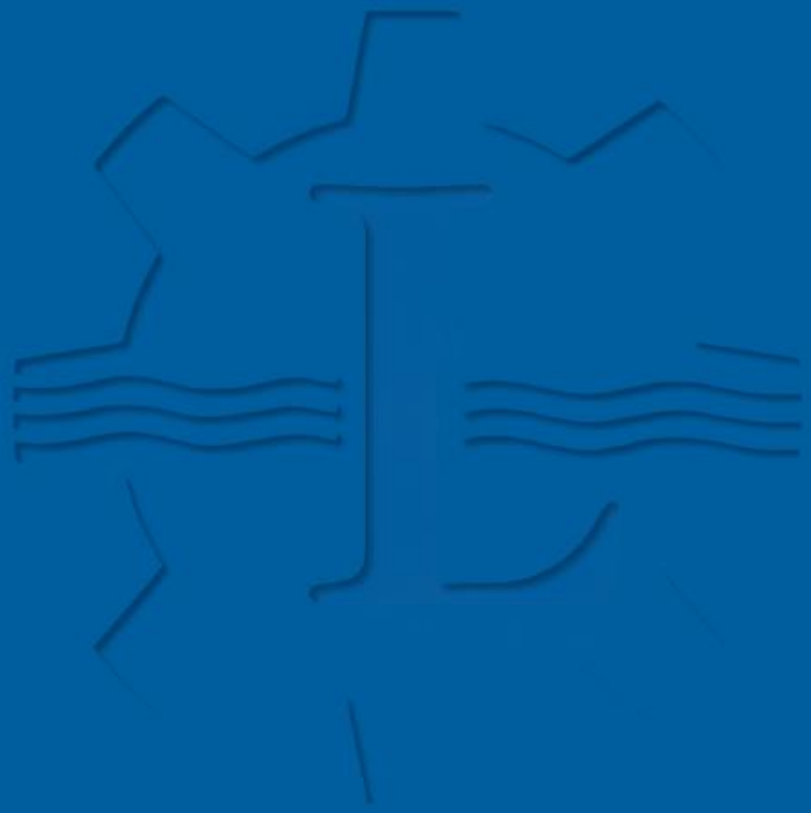
Since 2009 a new service center has been opened in Veenendaal, centrally located in the Netherlands. From this location even faster and more efficient service can be offered across the country.

24H SERVICE

For the home market, clients can count on the service department of Landustrie, seven days per week, day and night, so also during the weekend. The special thing of this service is that you don't need a subscription. You only will be charged for the service supplied.

FOR SERVICE PLEASE CALL

+31 515 - 48 68 80	during office hours
+31 6 - 51 27 83 24	call for 24h service



Landustrie

Landustrie Sneek BV
P.O Box 199
NL-8600 AD Sneek
The Netherlands

Tel. +31 515 - 48 68 88
Fax +31 515 - 41 23 98
e-mail info@landustrie.nl
website www.landustrie.nl

Office address Pieter Zeemanstraat 6, Sneek

Watertechnology

07-2012-1000 ENG

Hi,

My input for the 10 year plan.

As NH is a state that promotes "educate" and "don't regulate", **we need a plan to educate people on energy efficiency and renewable energies.** How it benefits their wallets (save $$), have a more comfortable building/home, healthier and safer building/home, and have more money $$ to spend locally in NH. For the State, slow done the importing of energy and keep the dollars in the State of NH.

There should be 3 flavors of educational workshops offered throughout NH.

1.) **Weatherization**: Most existing NH homes have way too much excess air flow going through them and poorly insulated. Educate folks about having an energy professional perform a comprehensive home energy audit for them to educate them about what they can do for themselves (do-it-self projects and advance projects energy professionals can do. Educate about the energy programs to help pay for these energy improvements (Home Performance with Energy Star). How to find qualified experienced home energy auditors - keep in mind anyone can do energy audits in NH as no licensing or certification required. And there is no definition of what is a home energy audit, I heard of windows sales people offering free home energy audits.

The Button Up NH Home Energy Savings workshops should be conducted throughout the state year round.

2.) **Renewable Energies:** As NH is the second most dependent state on heating oil, people need to be educated about alternative energies like using solar panels and air heat pumps (mini-splits), biomass (cord wood and pellets), geothermal, etc. This will save people lots of money and we reduce importing energy and exporting out $$.

3.) **Simple Do It Your Self Projects**. NH could reduce a significant amount of money leaving our State by having people switch to all LED light bulbs. Yes there are rebates and they are inexpensive, but people are still buying what they are comfortable with, like incandescent bulbs. Educate about phantom loads and ways to reduce - complete waste of energy and money. Clean dryer vents, turn hot water down to 120, how to improve existing windows, how to seal electrical outlets on exterior walls, seal up the bulkhead door and other opening to the outside in the basement, and much more.

So **we need a real push to educate NH people**. You can have all the policies, rebates and such - but if people are not educated and motivated then nothing happens.

Thanks,
Bob

Bob Eldredge
Concord, NH

NH should proceed in its energy policy, planning, and implementation according to the parameters laid out in the following links:

http://web.stanford.edu/group/efmh/jacobson/Articles/I/WWS-50-USState-plans.html

Interactive infographics:
http://thesolutionsproject.org/why-clean-energy/

Dear Mr. Ellms,

My general overall impression of the current energy strategy is that it has an over-reliance theme on renewable energies and efficiency measures in terms of reducing electricity bills. To be sure, these energies play a growing part in our energy mix and should be pursued as the free market allows. The current plan places an unrealistic hope that wind and solar are a panacea and seems to omit the extreme expense for the value obtained. I think a more balanced plan is warranted and a clear strategy for reducing energy costs should be explored. For instance, what should be our strategy for delivering more natural gas into the state during the winter to keep electric costs down?

It seems that there is an absence of any strategic plan for nuclear energy. As I understand it, there is a growing interest nationally in Small Modular Reactors (SMR). They are small (50 megawatts), far less expensive, and portable. Recently, the Nuclear Regulatory Commission just accepted the first application for one in Idaho. Perhaps we should leave the door open for the idea by mentioning it as a potential long range opportunity.

Thank you for the opportunity to comment and solicit our views.

Respectfully,

Doug Thomas
NH State Representative, Rockingham 05 (Londonderry)
www.dougthomasnh.com
603-490-3226